SEQUENCE LISTING

<110> Sorge, Joseph

<120> DNA POLYMERASES WITH REDUCED BASE ANALOG DETECTION ACTIVITY

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<140> US 10/734,563
<141> 2003-12-12

<150> US 10/298,680
<151> 2002-11-18

<150> 10/408,601
<151> 2003-04-07

<150> US 10/280,962
<151> 2002-10-25

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<170> PatentIn version 3.2

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<213> Thermococcus litoralis

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Lys Arg Tyr Ala Val Ile Asp Glu Glu Gly Lys Val Ile Thr Arg Gly
595 600 605

Leu Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln

610 615 620

Ala Arg Val Leu Glu Thr Ile Leu Lys His Gly Asp Val Glu Glu Ala
625 630 635 640

Val Arg Ile Val Lys Glu Val Ile Gln Lys Leu Ala Asn Tyr Glu Ile
645 650 655

Pro Pro Glu Lys Leu Ala Ile Tyr Glu Gln Ile Thr Arg Pro Leu His
660 665 670

Glu Tyr Lys Ala Ile Gly Pro His Val Ala Val Ala Lys Lys Leu Ala
675 680 685

Ala Lys Gly Val Lys Ile Lys Pro Gly Met Val Ile Gly Tyr Ile Val
690 695 700

Leu Arg Gly Asp Gly Pro Ile Ser Asn Arg Ala Ile Leu Ala Glu Glu
705 710 715 720

Tyr Asp Pro Lys Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn
725 730 735

Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Gly Phe Gly Tyr Arg
740 745 750

Lys Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Thr Ser
755 760 765

Trp Leu Asn Ile Lys Lys Ser
770 775

<210> 28
<211> 775
<212> PRT
<213> Pyrococcus sp.

<400> 28

Met Ile Leu Asp Ala Asp Tyr Ile Thr Glu Asp Gly Lys Pro Ile Ile
1 5 10 15

Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Val Glu Tyr Asp Arg
20 25 30

Asn Phe Arg Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Gln Ile
35 40 45

Asp Glu Val Arg Lys Ile Thr Ala Glu Arg His Gly Lys Ile Val Arg

50 55 60

Ile Ile Asp Ala Glu Lys Val Arg Lys Lys Phe Leu Gly Arg Pro Ile
65 70 75 80

Glu Val Trp Arg Leu Tyr Phe Glu His Pro Gln Asp Val Pro Ala Ile
85 90 95

Arg Asp Lys Ile Arg Glu His Ser Ala Val Ile Asp Ile Phe Glu Tyr
100 105 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
115 120 125

Met Glu Gly Asp Glu Glu Leu Lys Leu Leu Ala Phe Asp Ile Glu Thr
130 135 140

Leu Tyr His Glu Gly Glu Glu Phe Ala Lys Gly Pro Ile Ile Met Ile
145 150 155 160

Ser Tyr Ala Asp Glu Glu Glu Ala Lys Val Ile Thr Trp Lys Lys Ile
165 170 175

Asp Leu Pro Tyr Val Glu Val Val Ser Ser Glu Arg Glu Met Ile Lys
180 185 190

Arg Phe Leu Lys Val Ile Arg Glu Lys Asp Pro Asp Val Ile Ile Thr
195 200 205

Tyr Asn Gly Asp Ser Phe Asp Leu Pro Tyr Leu Val Lys Arg Ala Glu
210 215 220

Lys Leu Gly Ile Lys Leu Pro Leu Gly Arg Asp Gly Ser Glu Pro Lys
225 230 235 240

Met Gln Arg Leu Gly Asp Met Thr Ala Val Glu Ile Lys Gly Arg Ile
245 250 255

His Phe Asp Leu Tyr His Val Ile Arg Arg Thr Ile Asn Leu Pro Thr
260 265 270

Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Lys Pro Lys Glu
275 280 285

Lys Val Tyr Ala His Glu Ile Ala Glu Ala Trp Glu Thr Gly Lys Gly
290 295 300

Leu Glu Arg Val Ala Lys Tyr Ser Met Glu Asp Ala Lys Val Thr Tyr
305 310 315 320

Glu Leu Gly Arg Glu Phe Phe Pro Met Glu Ala Gln Leu Ser Arg Leu
325 330 335

Val Gly Gln Pro Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
340 345 350

Val Glu Trp Tyr Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Leu Ala
355 360 365

Pro Asn Lys Pro Asp Glu Arg Glu Tyr Glu Arg Arg Leu Arg Glu Ser
370 375 380

Tyr Ala Gly Gly Tyr Val Lys Glu Pro Glu Lys Gly Leu Trp Glu Gly
385 390 395 400

Leu Val Ser Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile Ile Thr
405 410 415

His Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Gly Cys Arg Glu Tyr
420 425 430

Asp Val Ala Pro Glu Val Gly His Lys Phe Cys Lys Asp Phe Pro Gly
435 440 445

Phe Ile Pro Ser Leu Leu Lys Arg Leu Leu Asp Glu Arg Gln Glu Ile
450 455 460

Lys Arg Lys Met Lys Ala Ser Lys Asp Pro Ile Glu Lys Lys Met Leu
465 470 475 480

Asp Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly
485 490 495

Tyr Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu
500 505 510

Ser Val Thr Ala Trp Gly Arg Glu Tyr Ile Glu Phe Val Arg Lys Glu
515 520 525

Leu Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ile Asp Thr Asp Gly
530 535 540

Leu Tyr Ala Thr Ile Pro Gly Ala Lys Pro Glu Glu Ile Lys Lys Lys
545 550 555 560

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Ala Leu Glu Phe Val Asp Tyr Ile Asn Ala Lys Leu Pro Gly Leu Leu
                565                 570                 575

Glu Leu Glu Tyr Glu Gly Phe Tyr Val Arg Gly Phe Phe Val Thr Lys
            580                 585                 590

Lys Lys Tyr Ala Leu Ile Asp Glu Glu Gly Lys Ile Ile Thr Arg Gly
        595                 600                 605

Leu Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln
    610                 615                 620

Ala Lys Val Leu Glu Ala Ile Leu Lys His Gly Asn Val Glu Glu Ala
625                 630                 635                 640

Val Lys Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Ile
                645                 650                 655

Pro Pro Glu Lys Leu Val Ile Tyr Glu Gln Ile Thr Arg Pro Leu His
            660                 665                 670

Glu Tyr Lys Ala Ile Gly Pro His Val Ala Val Ala Lys Arg Leu Ala
        675                 680                 685

Ala Arg Gly Val Lys Val Arg Pro Gly Met Val Ile Gly Tyr Ile Val
    690                 695                 700

Leu Arg Gly Asp Gly Pro Ile Ser Lys Arg Ala Ile Leu Ala Glu Glu
705                 710                 715                 720

Phe Asp Leu Arg Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn
                725                 730                 735

Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Ala Phe Gly Tyr Arg
            740                 745                 750

Lys Glu Asp Leu Arg Trp Gln Lys Thr Lys Gln Thr Gly Leu Thr Ala
        755                 760                 765

Trp Leu Asn Ile Lys Lys Lys
    770                 775
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<210> 29
<211> 773
<212> PRT
<213> thermococcus gorgonarius

<400> 29

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Met Ile Leu Asp Thr Asp Tyr Ile Thr Glu Asp Gly Lys Pro Val Ile
1               5                  10                  15

Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Asp Tyr Asp Arg
            20                  25                  30

Asn Phe Glu Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
        35                  40                  45

Glu Asp Val Lys Lys Ile Thr Ala Glu Arg His Gly Thr Thr Val Arg
    50                  55                  60

Val Val Arg Ala Glu Lys Val Lys Lys Lys Phe Leu Gly Arg Pro Ile
65                  70                  75                  80

Glu Val Trp Lys Leu Tyr Phe Thr His Pro Gln Asp Val Pro Ala Ile
                85                  90                  95

Arg Asp Lys Ile Lys Glu His Pro Ala Val Val Asp Ile Tyr Glu Tyr
            100                 105                 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
        115                 120                 125

Met Glu Gly Asp Glu Glu Leu Lys Met Leu Ala Phe Asp Ile Glu Thr
    130                 135                 140

Leu Tyr His Glu Gly Glu Glu Phe Ala Glu Gly Pro Ile Leu Met Ile
145                 150                 155                 160

Ser Tyr Ala Asp Glu Glu Gly Ala Arg Val Ile Thr Trp Lys Asn Ile
                165                 170                 175

Asp Leu Pro Tyr Val Asp Val Val Ser Thr Glu Lys Glu Met Ile Lys
            180                 185                 190

Arg Phe Leu Lys Val Val Lys Glu Lys Asp Pro Asp Val Leu Ile Thr
        195                 200                 205

Tyr Asn Gly Asp Asn Phe Asp Phe Ala Tyr Leu Lys Lys Arg Ser Glu
    210                 215                 220

Lys Leu Gly Val Lys Phe Ile Leu Gly Arg Glu Gly Ser Glu Pro Lys
225                 230                 235                 240

Ile Gln Arg Met Gly Asp Arg Phe Ala Val Glu Val Lys Gly Arg Ile
                245                 250                 255
```

His Phe Asp Leu Tyr Pro Val Ile Arg Arg Thr Ile Asn Leu Pro Thr
260 265 270

Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Gln Pro Lys Glu
275 280 285

Lys Val Tyr Ala Glu Glu Ile Ala Gln Ala Trp Glu Thr Gly Glu Gly
290 295 300

Leu Glu Arg Val Ala Arg Tyr Ser Met Glu Asp Ala Lys Val Thr Tyr
305 310 315 320

Glu Leu Gly Lys Glu Phe Phe Pro Met Glu Ala Gln Leu Ser Arg Leu
325 330 335

Val Gly Gln Ser Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
340 345 350

Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Leu Ala
355 360 365

Pro Asn Lys Pro Asp Glu Arg Glu Leu Ala Arg Arg Arg Glu Ser Tyr
370 375 380

Ala Gly Gly Tyr Val Lys Glu Pro Glu Arg Gly Leu Trp Glu Asn Ile
385 390 395 400

Val Tyr Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile Ile Thr His
405 410 415

Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Gly Cys Glu Glu Tyr Asp
420 425 430

Val Ala Pro Gln Val Gly His Lys Phe Cys Lys Asp Phe Pro Gly Phe
435 440 445

Ile Pro Ser Leu Leu Gly Asp Leu Leu Glu Glu Arg Gln Lys Val Lys
450 455 460

Lys Lys Met Lys Ala Thr Ile Asp Pro Ile Glu Lys Lys Leu Leu Asp
465 470 475 480

Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Phe Tyr Gly Tyr
485 490 495

Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu Ser

500 505 510

Val Thr Ala Trp Gly Arg Gln Tyr Ile Glu Thr Thr Ile Arg Glu Ile
515 520 525

Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ala Asp Thr Asp Gly Phe
530 535 540

Phe Ala Thr Ile Pro Gly Ala Asp Ala Glu Thr Val Lys Lys Lys Ala
545 550 555 560

Lys Glu Phe Leu Asp Tyr Ile Asn Ala Lys Leu Pro Gly Leu Leu Glu
565 570 575

Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys Lys
580 585 590

Lys Tyr Ala Val Ile Asp Glu Glu Asp Lys Ile Thr Thr Arg Gly Leu
595 600 605

Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala
610 615 620

Arg Val Leu Glu Ala Ile Leu Lys His Gly Asp Val Glu Glu Ala Val
625 630 635 640

Arg Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Val Pro
645 650 655

Pro Glu Lys Leu Val Ile Tyr Glu Gln Ile Thr Arg Asp Leu Lys Asp
660 665 670

Tyr Lys Ala Thr Gly Pro His Val Ala Val Ala Lys Arg Leu Ala Ala
675 680 685

Arg Gly Ile Lys Ile Arg Pro Gly Thr Val Ile Ser Tyr Ile Val Leu
690 695 700

Lys Gly Ser Gly Arg Ile Gly Asp Arg Ala Ile Pro Phe Asp Glu Phe
705 710 715 720

Asp Pro Ala Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln
725 730 735

Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys
740 745 750

Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Gly Ala Trp
755 760 765

Leu Lys Pro Lys Thr
770

<210> 30
<211> 774
<212> PRT
<213> Pyrococcus sp.

<400> 30

Met Ile Leu Asp Thr Asp Tyr Ile Thr Glu Asp Gly Lys Pro Val Ile
1 5 10 15

Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Glu Tyr Asp Arg
20 25 30

Thr Phe Glu Pro Tyr Phe Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
35 40 45

Glu Glu Val Lys Lys Ile Thr Ala Glu Arg His Gly Thr Val Val Thr
50 55 60

Val Lys Arg Val Glu Lys Val Gln Lys Lys Phe Leu Gly Arg Pro Val
65 70 75 80

Glu Val Trp Lys Leu Tyr Phe Thr His Pro Gln Asp Val Pro Ala Ile
85 90 95

Arg Asp Lys Ile Arg Glu His Gly Ala Val Ile Asp Ile Tyr Glu Tyr
100 105 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Val Pro
115 120 125

Met Glu Gly Asp Glu Glu Leu Lys Met Leu Ala Phe Asp Ile Gln Thr
130 135 140

Leu Tyr His Glu Gly Glu Glu Phe Ala Glu Gly Pro Ile Leu Met Ile
145 150 155 160

Ser Tyr Ala Asp Glu Glu Gly Ala Arg Val Ile Thr Trp Lys Asn Val
165 170 175

Asp Leu Pro Tyr Val Asp Val Val Ser Thr Glu Arg Glu Met Ile Lys
180 185 190

Arg Phe Leu Arg Val Val Lys Glu Lys Asp Pro Asp Val Leu Ile Thr
195 200 205

Tyr Asn Gly Asp Asn Phe Asp Phe Ala Tyr Leu Lys Lys Arg Cys Glu
210 215 220

Lys Leu Gly Ile Asn Phe Ala Leu Gly Arg Asp Gly Ser Glu Pro Lys
225 230 235 240

Ile Gln Arg Met Gly Asp Arg Phe Ala Val Glu Val Lys Gly Arg Ile
245 250 255

His Phe Asp Leu Tyr Pro Val Ile Arg Arg Thr Ile Asn Leu Pro Thr
260 265 270

Tyr Thr Leu Glu Ala Val Tyr Glu Ala Val Phe Gly Gln Pro Lys Glu
275 280 285

Lys Val Tyr Ala Glu Glu Ile Thr Pro Ala Trp Glu Thr Gly Glu Asn
290 295 300

Leu Glu Arg Val Ala Arg Tyr Ser Met Glu Asp Ala Lys Val Thr Tyr
305 310 315 320

Glu Leu Gly Lys Glu Phe Leu Pro Met Glu Ala Gln Leu Ser Arg Leu
325 330 335

Ile Gly Gln Ser Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
340 345 350

Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Leu Ala
355 360 365

Pro Asn Lys Pro Asp Glu Lys Glu Leu Ala Arg Arg Arg Gln Ser Tyr
370 375 380

Glu Gly Gly Tyr Val Lys Glu Pro Glu Arg Gly Leu Trp Glu Asn Ile
385 390 395 400

Val Tyr Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile Ile Thr His
405 410 415

Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Gly Cys Lys Glu Tyr Asp
420 425 430

Val Ala Pro Gln Val Gly His Arg Phe Cys Lys Asp Phe Pro Gly Phe
435 440 445

Ile Pro Ser Leu Leu Gly Asp Leu Leu Glu Glu Arg Gln Lys Ile Lys
450 455 460

Lys Lys Met Lys Ala Thr Ile Asp Pro Ile Glu Arg Lys Leu Leu Asp
465 470 475 480

Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly Tyr
485 490 495

Tyr Gly Tyr Ala Arg Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu Ser
500 505 510

Val Thr Ala Trp Gly Arg Glu Tyr Ile Thr Met Thr Ile Lys Glu Ile
515 520 525

Glu Glu Lys Tyr Gly Phe Lys Val Ile Tyr Ser Asp Thr Asp Gly Phe
530 535 540

Phe Ala Thr Ile Pro Gly Ala Asp Ala Glu Thr Val Lys Lys Lys Ala
545 550 555 560

Met Glu Phe Leu Asn Tyr Ile Asn Ala Lys Leu Pro Gly Ala Leu Glu
565 570 575

Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys Lys
580 585 590

Lys Tyr Ala Val Ile Asp Glu Glu Gly Lys Ile Thr Thr Arg Gly Leu
595 600 605

Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala
610 615 620

Arg Val Leu Glu Ala Leu Leu Lys Asp Gly Asp Val Glu Lys Ala Val
625 630 635 640

Arg Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Val Pro
645 650 655

Pro Glu Lys Leu Val Ile His Glu Gln Ile Thr Arg Asp Leu Lys Asp
660 665 670

Tyr Lys Ala Thr Gly Pro His Val Ala Val Ala Lys Arg Leu Ala Ala
675 680 685

Arg Gly Val Lys Ile Arg Pro Gly Thr Val Ile Ser Tyr Ile Val Leu
690 695 700

Lys Gly Ser Gly Arg Ile Gly Asp Arg Ala Ile Pro Phe Asp Glu Phe
705 710 715 720

Asp Pro Thr Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln
725 730 735

Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys
740 745 750

Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Ser Ala Trp
755 760 765

Leu Lys Pro Lys Gly Thr
770

<210> 31
<211> 774
<212> PRT
<213> thermococcus litoralis

<400> 31

Met Ile Leu Asp Thr Asp Tyr Ile Thr Lys Asp Gly Lys Pro Ile Ile
1 5 10 15

Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Glu Leu Asp Pro
20 25 30

His Phe Gln Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
35 40 45

Glu Glu Ile Lys Ala Ile Lys Gly Glu Arg His Gly Lys Thr Val Arg
50 55 60

Val Leu Asp Ala Val Lys Val Arg Lys Lys Phe Leu Gly Arg Glu Val
65 70 75 80

Glu Val Trp Lys Leu Ile Phe Glu His Pro Gln Asp Val Pro Ala Met
85 90 95

Arg Gly Lys Ile Arg Glu His Pro Ala Val Val Asp Ile Tyr Glu Tyr
100 105 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
115 120 125

Met Glu Gly Asp Glu Glu Leu Lys Leu Leu Ala Phe Asp Ile Glu Thr
130 135 140

Phe Tyr His Glu Gly Asp Glu Phe Gly Lys Gly Glu Ile Ile Met Ile
145 150 155 160

Ser Tyr Ala Asp Glu Glu Glu Ala Arg Val Ile Thr Trp Lys Asn Ile
165 170 175

Asp Leu Pro Tyr Val Asp Val Val Ser Asn Glu Arg Glu Met Ile Lys
180 185 190

Arg Phe Val Gln Val Val Lys Glu Lys Asp Pro Asp Val Ile Ile Thr
195 200 205

Tyr Asn Gly Asp Asn Phe Asp Leu Pro Tyr Leu Ile Lys Arg Ala Glu
210 215 220

Lys Leu Gly Val Arg Leu Val Leu Gly Arg Asp Lys Glu His Pro Glu
225 230 235 240

Pro Lys Ile Gln Arg Met Gly Asp Ser Phe Ala Val Glu Ile Lys Gly
245 250 255

Arg Ile His Phe Asp Leu Phe Pro Val Val Arg Arg Thr Ile Asn Leu
260 265 270

Pro Thr Tyr Thr Leu Glu Ala Val Tyr Glu Ala Val Leu Gly Lys Thr
275 280 285

Lys Ser Lys Leu Gly Ala Glu Glu Ile Ala Ala Ile Trp Glu Thr Glu
290 295 300

Glu Ser Met Lys Lys Leu Ala Gln Tyr Ser Met Glu Asp Ala Arg Ala
305 310 315 320

Thr Tyr Glu Leu Gly Lys Glu Phe Phe Pro Met Glu Ala Glu Leu Ala
325 330 335

Lys Leu Ile Gly Gln Ser Val Trp Asp Val Ser Arg Ser Ser Thr Gly
340 345 350

Asn Leu Val Glu Trp Tyr Leu Leu Arg Val Ala Tyr Ala Arg Asn Glu
355 360 365

Leu Ala Pro Asn Lys Pro Asp Glu Glu Glu Tyr Lys Arg Arg Leu Arg
370 375 380

Thr Thr Tyr Leu Gly Gly Tyr Val Lys Glu Pro Glu Lys Gly Leu Trp

385 390 395 400

Glu Asn Ile Ile Tyr Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile
405 410 415

Val Thr His Asn Val Ser Pro Asp Thr Leu Glu Lys Glu Gly Cys Lys
420 425 430

Asn Tyr Asp Val Ala Pro Ile Val Gly Tyr Arg Phe Cys Lys Asp Phe
435 440 445

Pro Gly Phe Ile Pro Ser Ile Leu Gly Asp Leu Ile Ala Met Arg Gln
450 455 460

Asp Ile Lys Lys Lys Met Lys Ser Thr Ile Asp Pro Ile Glu Lys Lys
465 470 475 480

Met Leu Asp Tyr Arg Gln Arg Ala Ile Lys Leu Leu Ala Asn Ser Tyr
485 490 495

Tyr Gly Tyr Met Gly Tyr Pro Lys Ala Arg Trp Tyr Ser Lys Glu Cys
500 505 510

Ala Glu Ser Val Thr Ala Trp Gly Arg His Tyr Ile Glu Met Thr Ile
515 520 525

Arg Glu Ile Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ala Asp Thr
530 535 540

Asp Gly Phe Tyr Ala Thr Ile Pro Gly Glu Lys Pro Glu Leu Ile Lys
545 550 555 560

Lys Lys Ala Lys Glu Phe Leu Asn Tyr Ile Asn Ser Lys Leu Pro Gly
565 570 575

Leu Leu Glu Leu Glu Tyr Glu Gly Phe Tyr Leu Arg Gly Phe Phe Val
580 585 590

Thr Lys Lys Arg Tyr Ala Val Ile Asp Glu Glu Gly Arg Ile Thr Thr
595 600 605

Arg Gly Leu Glu Val Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu
610 615 620

Thr Gln Ala Lys Val Leu Glu Ala Ile Leu Lys Glu Gly Ser Val Glu
625 630 635 640

Lys Ala Val Glu Val Val Arg Asp Val Val Glu Lys Ile Ala Lys Tyr
645 650 655

Arg Val Pro Leu Glu Lys Leu Val Ile His Glu Gln Ile Thr Arg Asp
660 665 670

Leu Lys Asp Tyr Lys Ala Ile Gly Pro His Val Ala Ile Ala Lys Arg
675 680 685

Leu Ala Ala Arg Gly Ile Lys Val Lys Pro Gly Thr Ile Ile Ser Tyr
690 695 700

Ile Val Leu Lys Gly Ser Gly Lys Ile Ser Asp Arg Val Ile Leu Leu
705 710 715 720

Thr Glu Tyr Asp Pro Arg Lys His Lys Tyr Asp Pro Asp Tyr Tyr Ile
725 730 735

Glu Asn Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Ala Phe Gly
740 745 750

Tyr Arg Lys Glu Asp Leu Arg Tyr Gln Ser Ser Lys Gln Thr Gly Leu
755 760 765

Asp Ala Trp Leu Lys Arg
770

<210> 32
<211> 776
<212> PRT
<213> Thermococcus sp.

<400> 32

Met Ile Leu Asp Val Asp Tyr Ile Thr Glu Asn Gly Lys Pro Val Ile
1 5 10 15

Arg Val Phe Lys Lys Glu Asn Gly Glu Phe Arg Ile Glu Tyr Asp Arg
20 25 30

Glu Phe Glu Pro Tyr Phe Tyr Ala Leu Leu Arg Asp Asp Ser Ala Ile
35 40 45

Glu Glu Ile Lys Lys Ile Thr Ala Glu Arg His Gly Arg Val Val Lys
50 55 60

Val Lys Arg Ala Glu Lys Val Lys Lys Lys Phe Leu Gly Arg Ser Val
65 70 75 80

Glu Val Trp Val Leu Tyr Phe Thr His Pro Gln Asp Val Pro Ala Ile
85 90 95

Arg Asp Lys Ile Arg Lys His Pro Ala Val Ile Asp Ile Tyr Glu Tyr
100 105 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
115 120 125

Met Glu Gly Glu Glu Glu Leu Lys Leu Met Ser Phe Asp Ile Glu Thr
130 135 140

Leu Tyr His Glu Gly Glu Glu Phe Gly Thr Gly Pro Ile Leu Met Ile
145 150 155 160

Ser Tyr Ala Asp Glu Ser Glu Ala Arg Val Ile Thr Trp Lys Lys Ile
165 170 175

Asp Leu Pro Tyr Val Glu Val Val Ser Thr Glu Lys Glu Met Ile Lys
180 185 190

Arg Phe Leu Arg Val Val Lys Glu Lys Asp Pro Asp Val Leu Ile Thr
195 200 205

Tyr Asn Gly Asp Asn Phe Asp Phe Ala Tyr Leu Lys Lys Arg Cys Glu
210 215 220

Lys Leu Gly Val Ser Phe Thr Leu Gly Arg Asp Gly Ser Glu Pro Lys
225 230 235 240

Ile Gln Arg Met Gly Asp Arg Phe Ala Val Glu Val Lys Gly Arg Val
245 250 255

His Phe Asp Leu Tyr Pro Val Ile Arg Arg Thr Ile Asn Leu Pro Thr
260 265 270

Tyr Thr Leu Glu Ala Val Tyr Glu Ala Val Phe Gly Lys Pro Lys Glu
275 280 285

Lys Val Tyr Ala Glu Glu Ile Ala Thr Ala Trp Glu Thr Gly Glu Gly
290 295 300

Leu Glu Arg Val Ala Arg Tyr Ser Met Glu Asp Ala Arg Val Thr Tyr
305 310 315 320

Glu Leu Gly Arg Glu Phe Phe Pro Met Glu Ala Gln Leu Ser Arg Leu
325 330 335

Ile Gly Gln Gly Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
340 345 350

Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Leu Ala
355 360 365

Pro Asn Lys Pro Asp Glu Arg Glu Leu Ala Arg Arg Arg Gly Gly Tyr
370 375 380

Ala Gly Gly Tyr Val Lys Glu Pro Glu Arg Gly Leu Trp Asp Asn Ile
385 390 395 400

Val Tyr Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile Ile Thr His
405 410 415

Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Gly Cys Arg Ser Tyr Asp
420 425 430

Val Ala Pro Glu Val Gly His Lys Phe Cys Lys Asp Phe Pro Gly Phe
435 440 445

Ile Pro Ser Leu Leu Gly Asn Leu Leu Glu Glu Arg Gln Lys Ile Lys
450 455 460

Arg Lys Met Lys Ala Thr Leu Asp Pro Leu Glu Lys Asn Leu Leu Asp
465 470 475 480

Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly Tyr
485 490 495

Tyr Gly Tyr Ala Arg Ala Arg Trp Tyr Cys Arg Glu Cys Ala Glu Ser
500 505 510

Val Thr Ala Trp Gly Arg Glu Tyr Ile Glu Met Val Ile Arg Glu Leu
515 520 525

Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ala Asp Thr Asp Gly Leu
530 535 540

His Ala Thr Ile Pro Gly Ala Asp Ala Glu Thr Val Lys Lys Lys Ala
545 550 555 560

Met Glu Phe Leu Asn Tyr Ile Asn Pro Lys Leu Pro Gly Leu Leu Glu
565 570 575

Leu Glu Tyr Glu Gly Phe Tyr Val Arg Gly Phe Phe Val Thr Lys Lys
580 585 590

Lys Tyr Ala Val Ile Asp Glu Glu Gly Lys Ile Thr Thr Arg Gly Leu
595 600 605

Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala
610 615 620

Arg Val Leu Glu Ala Ile Leu Arg His Gly Asp Val Glu Glu Ala Val
625 630 635 640

Arg Ile Val Arg Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Val Pro
645 650 655

Pro Glu Lys Leu Val Ile His Glu Gln Ile Thr Arg Glu Leu Lys Asp
660 665 670

Tyr Lys Ala Thr Gly Pro His Val Ala Ile Ala Lys Arg Leu Ala Ala
675 680 685

Arg Gly Val Lys Ile Arg Pro Gly Thr Val Ile Ser Tyr Ile Val Leu
690 695 700

Lys Gly Ser Gly Arg Ile Gly Asp Arg Ala Ile Pro Phe Asp Glu Phe
705 710 715 720

Asp Pro Thr Lys His Lys Tyr Asp Ala Asp Tyr Tyr Ile Glu Asn Gln
725 730 735

Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys
740 745 750

Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Gly Ala Trp
755 760 765

Leu Lys Pro Lys Gly Lys Lys Lys
770 775

<210> 33
<211> 775
<212> PRT
<213> Pyrococcus furiosus

<400> 33

Met Ile Leu Asp Val Asp Tyr Ile Thr Glu Glu Gly Lys Pro Val Ile
1 5 10 15

Arg Leu Phe Lys Lys Glu Asn Gly Lys Phe Lys Ile Glu His Asp Arg
20 25 30

Thr Phe Arg Pro Tyr Ile Tyr Ala Leu Leu Arg Asp Asp Ser Lys Ile
35 40 45

Glu Glu Val Lys Lys Ile Thr Gly Glu Arg His Gly Lys Ile Val Arg
50 55 60

Ile Val Asp Val Glu Lys Val Glu Lys Lys Phe Leu Gly Lys Pro Ile
65 70 75 80

Thr Val Trp Lys Leu Tyr Leu Glu His Pro Gln Asp Val Pro Thr Ile
85 90 95

Arg Glu Lys Val Arg Glu His Pro Ala Val Val Asp Ile Phe Glu Tyr
100 105 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
115 120 125

Met Glu Gly Glu Glu Glu Leu Lys Ile Leu Ala Phe Asp Ile Glu Thr
130 135 140

Leu Tyr His Glu Gly Glu Glu Phe Gly Lys Gly Pro Ile Ile Met Ile
145 150 155 160

Ser Tyr Ala Asp Glu Asn Glu Ala Lys Val Ile Thr Trp Lys Asn Ile
165 170 175

Asp Leu Pro Tyr Val Glu Val Val Ser Ser Glu Arg Glu Met Ile Lys
180 185 190

Arg Phe Leu Arg Ile Ile Arg Glu Lys Asp Pro Asp Ile Ile Val Thr
195 200 205

Tyr Asn Gly Asp Ser Phe Asp Phe Pro Tyr Leu Ala Lys Arg Ala Glu
210 215 220

Lys Leu Gly Ile Lys Leu Thr Ile Gly Arg Asp Gly Ser Glu Pro Lys
225 230 235 240

Met Gln Arg Ile Gly Asp Met Thr Ala Val Glu Val Lys Gly Arg Ile
245 250 255

His Phe Asp Leu Tyr His Val Ile Thr Arg Thr Ile Asn Leu Pro Thr
260 265 270

Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Lys Pro Lys Glu

275 280 285

Lys Val Tyr Ala Asp Glu Ile Ala Lys Ala Trp Glu Ser Gly Glu Asn
290 295 300

Leu Glu Arg Val Ala Lys Tyr Ser Met Glu Asp Ala Lys Ala Thr Tyr
305 310 315 320

Glu Leu Gly Lys Glu Phe Leu Pro Met Glu Ile Gln Leu Ser Arg Leu
325 330 335

Val Gly Gln Pro Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
340 345 350

Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Val Ala
355 360 365

Pro Asn Lys Pro Ser Glu Glu Glu Tyr Gln Arg Arg Leu Arg Glu Ser
370 375 380

Tyr Thr Pro Gly Phe Val Lys Glu Pro Glu Lys Gly Leu Trp Glu Asn
385 390 395 400

Ile Val Tyr Leu Asp Phe Arg Ala Leu Tyr Pro Ser Ile Ile Ile Thr
405 410 415

His Asn Val Ser Pro Asp Thr Leu Asn Leu Glu Gly Cys Lys Asn Tyr
420 425 430

Asp Ile Ala Pro Gln Val Gly His Lys Phe Cys Lys Asp Ile Pro Gly
435 440 445

Phe Ile Pro Ser Leu Leu Gly His Leu Leu Glu Glu Arg Gln Lys Ile
450 455 460

Lys Thr Lys Met Lys Glu Thr Gln Asp Pro Ile Glu Lys Ile Leu Leu
465 470 475 480

Asp Tyr Arg Gln Lys Ala Ile Lys Leu Leu Ala Asn Ser Phe Tyr Gly
485 490 495

Tyr Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu
500 505 510

Ser Val Thr Ala Trp Gly Arg Lys Tyr Ile Glu Leu Val Trp Lys Glu
515 520 525

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Leu Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ile Asp Thr Asp Gly
    530                 535                 540

Leu Tyr Ala Thr Ile Pro Gly Gly Glu Ser Glu Glu Ile Lys Lys Lys
545                 550                 555                 560

Ala Leu Glu Phe Val Lys Tyr Ile Asn Ser Lys Leu Pro Gly Leu Leu
                565                 570                 575

Glu Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys
            580                 585                 590

Lys Arg Tyr Ala Val Ile Asp Glu Glu Gly Lys Val Ile Thr Arg Gly
        595                 600                 605

Leu Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln
    610                 615                 620

Ala Arg Val Leu Glu Thr Ile Leu Lys His Gly Asp Val Glu Glu Ala
625                 630                 635                 640

Val Arg Ile Val Lys Glu Val Ile Gln Lys Leu Ala Asn Tyr Glu Ile
                645                 650                 655

Pro Pro Glu Lys Leu Ala Ile Tyr Glu Gln Ile Thr Arg Pro Leu His
            660                 665                 670

Glu Tyr Lys Ala Ile Gly Pro His Val Ala Val Ala Lys Lys Leu Ala
        675                 680                 685

Ala Lys Gly Val Lys Ile Lys Pro Gly Met Val Ile Gly Tyr Ile Val
    690                 695                 700

Leu Arg Gly Asp Gly Pro Ile Ser Asn Arg Ala Ile Leu Ala Glu Glu
705                 710                 715                 720

Tyr Asp Pro Lys Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn
                725                 730                 735

Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Gly Phe Gly Tyr Arg
            740                 745                 750

Lys Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Thr Ser
        755                 760                 765

Trp Leu Asn Ile Lys Lys Ser
    770                 775
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<210> 34
<211> 775
<212> PRT
<213> Pyrococcus furiosus

<400> 34

Met Ile Leu Asp Val Asp Tyr Ile Thr Glu Glu Gly Lys Pro Val Ile
1 5 10 15

Arg Leu Phe Lys Lys Glu Asn Gly Lys Phe Lys Ile Glu His Asp Arg
20 25 30

Thr Phe Arg Pro Tyr Ile Tyr Ala Leu Leu Arg Asp Asp Ser Lys Ile
35 40 45

Glu Glu Val Lys Lys Ile Thr Gly Glu Arg His Gly Lys Ile Val Arg
50 55 60

Ile Val Asp Val Glu Lys Val Glu Lys Lys Phe Leu Gly Lys Pro Ile
65 70 75 80

Thr Val Trp Lys Leu Tyr Leu Glu His Pro Gln Asp Val Pro Thr Ile
85 90 95

Arg Glu Lys Val Arg Glu His Pro Ala Val Val Asp Ile Phe Glu Tyr
100 105 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
115 120 125

Met Glu Gly Glu Glu Glu Leu Lys Ile Leu Ala Phe Ala Ile Ala Thr
130 135 140

Leu Tyr His Glu Gly Glu Glu Phe Gly Lys Gly Pro Ile Ile Met Ile
145 150 155 160

Ser Tyr Ala Asp Glu Asn Glu Ala Lys Val Ile Thr Trp Lys Asn Ile
165 170 175

Asp Leu Pro Tyr Val Glu Val Val Ser Ser Glu Arg Glu Met Ile Lys
180 185 190

Arg Phe Leu Arg Ile Ile Arg Glu Lys Asp Pro Asp Ile Ile Val Thr
195 200 205

Tyr Asn Gly Asp Ser Phe Asp Phe Pro Tyr Leu Ala Lys Arg Ala Glu
210 215 220

Lys Leu Gly Ile Lys Leu Thr Ile Gly Arg Asp Gly Ser Glu Pro Lys
225 230 235 240

Met Gln Arg Ile Gly Asp Met Thr Ala Val Glu Val Lys Gly Arg Ile
245 250 255

His Phe Asp Leu Tyr His Val Ile Thr Arg Thr Ile Asn Leu Pro Thr
260 265 270

Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Lys Pro Lys Glu
275 280 285

Lys Val Tyr Ala Asp Glu Ile Ala Lys Ala Trp Glu Ser Gly Glu Asn
290 295 300

Leu Glu Arg Val Ala Lys Tyr Ser Met Glu Asp Ala Lys Ala Thr Tyr
305 310 315 320

Glu Leu Gly Lys Glu Phe Leu Pro Met Glu Ile Gln Leu Ser Arg Leu
325 330 335

Val Gly Gln Pro Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
340 345 350

Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Val Ala
355 360 365

Pro Asn Lys Pro Ser Glu Glu Glu Tyr Gln Arg Arg Leu Arg Glu Ser
370 375 380

Tyr Thr Gly Gly Phe Val Lys Glu Pro Glu Lys Gly Leu Trp Glu Asn
385 390 395 400

Ile Val Tyr Leu Asp Phe Arg Ala Leu Tyr Pro Ser Ile Ile Ile Thr
405 410 415

His Asn Val Ser Pro Asp Thr Leu Asn Leu Glu Gly Cys Lys Asn Tyr
420 425 430

Asp Ile Ala Pro Gln Val Gly His Lys Phe Cys Lys Asp Ile Pro Gly
435 440 445

Phe Ile Pro Ser Leu Leu Gly His Leu Leu Glu Glu Arg Gln Lys Ile
450 455 460

Lys Thr Lys Met Lys Glu Thr Gln Asp Pro Ile Glu Lys Ile Leu Leu
465 470 475 480

Asp Tyr Arg Gln Lys Ala Ile Lys Leu Leu Ala Asn Ser Phe Tyr Gly
485 490 495

Tyr Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu
500 505 510

Ser Val Thr Ala Trp Gly Arg Lys Tyr Ile Glu Leu Val Trp Lys Glu
515 520 525

Leu Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ile Asp Thr Asp Gly
530 535 540

Leu Tyr Ala Thr Ile Pro Gly Gly Glu Ser Glu Glu Ile Lys Lys Lys
545 550 555 560

Ala Leu Glu Phe Val Lys Tyr Ile Asn Ser Lys Leu Pro Gly Leu Leu
565 570 575

Glu Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys
580 585 590

Lys Arg Tyr Ala Val Ile Asp Glu Glu Gly Lys Val Ile Thr Arg Gly
595 600 605

Leu Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln
610 615 620

Ala Arg Val Leu Glu Thr Ile Leu Lys His Gly Asp Val Glu Glu Ala
625 630 635 640

Val Arg Ile Val Lys Glu Val Ile Gln Lys Leu Ala Asn Tyr Glu Ile
645 650 655

Pro Pro Glu Lys Leu Ala Ile Tyr Glu Gln Ile Thr Arg Pro Leu His
660 665 670

Glu Tyr Lys Ala Ile Gly Pro His Val Ala Val Ala Lys Lys Leu Ala
675 680 685

Ala Lys Gly Val Lys Ile Lys Pro Gly Met Val Ile Gly Tyr Ile Val
690 695 700

Leu Arg Gly Asp Gly Pro Ile Ser Asn Arg Ala Ile Leu Ala Glu Glu
705 710 715 720

Tyr Asp Pro Lys Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn

725 730 735

Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Gly Phe Gly Tyr Arg
740 745 750

Lys Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Thr Ser
755 760 765

Trp Leu Asn Ile Lys Lys Ser
770 775

<210> 35
<211> 774
<212> PRT
<213> Pyrococcus furiosus

<400> 35

Met Ile Leu Asp Val Asp Tyr Ile Thr Glu Glu Gly Lys Pro Val Ile
1 5 10 15

Arg Leu Phe Lys Lys Glu Asn Gly Lys Phe Lys Ile Glu His Asp Arg
20 25 30

Thr Phe Arg Pro Tyr Ile Tyr Ala Leu Leu Arg Asp Asp Ser Lys Ile
35 40 45

Glu Glu Val Lys Lys Ile Thr Gly Glu Arg His Gly Lys Ile Val Arg
50 55 60

Ile Val Asp Val Glu Lys Val Glu Lys Lys Phe Leu Gly Lys Pro Ile
65 70 75 80

Thr Val Trp Lys Leu Tyr Leu Glu His Pro Gln Asp Pro Thr Ile Arg
85 90 95

Glu Lys Val Arg Glu His Pro Ala Val Val Asp Ile Phe Glu Tyr Asp
100 105 110

Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro Met
115 120 125

Glu Gly Glu Glu Glu Leu Lys Ile Leu Ala Phe Asp Ile Glu Thr Leu
130 135 140

Tyr His Glu Gly Glu Glu Phe Gly Lys Gly Pro Ile Ile Met Ile Ser
145 150 155 160

Tyr Ala Asp Glu Asn Glu Ala Lys Val Ile Thr Trp Lys Asn Ile Asp

165 170 175

Leu Pro Tyr Val Glu Val Val Ser Ser Glu Arg Glu Met Ile Lys Arg
180 185 190

Phe Leu Arg Ile Ile Arg Glu Lys Asp Pro Asp Ile Ile Val Thr Tyr
195 200 205

Asn Gly Asp Ser Phe Asp Phe Pro Tyr Leu Ala Lys Arg Ala Glu Lys
210 215 220

Leu Gly Ile Lys Leu Thr Ile Gly Arg Asp Gly Ser Glu Pro Lys Met
225 230 235 240

Gln Arg Ile Gly Asp Met Thr Ala Val Glu Val Lys Gly Arg Ile His
245 250 255

Phe Asp Leu Tyr His Val Ile Thr Arg Thr Ile Asn Leu Pro Thr Tyr
260 265 270

Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Lys Pro Lys Glu Lys
275 280 285

Val Tyr Ala Asp Glu Ile Ala Lys Ala Trp Glu Ser Gly Glu Asn Leu
290 295 300

Glu Arg Val Ala Lys Tyr Ser Met Glu Asp Ala Lys Ala Thr Tyr Glu
305 310 315 320

Leu Gly Lys Glu Phe Leu Pro Met Glu Ile Gln Leu Ser Arg Leu Val
325 330 335

Gly Gln Pro Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu Val
340 345 350

Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Val Ala Pro
355 360 365

Asn Lys Pro Ser Glu Glu Glu Tyr Gln Arg Arg Leu Arg Glu Ser Tyr
370 375 380

Thr Gly Gly Phe Val Lys Glu Pro Glu Lys Gly Leu Trp Glu Asn Ile
385 390 395 400

Val Tyr Leu Asp Phe Arg Ala Leu Tyr Pro Ser Ile Ile Ile Thr His
405 410 415

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Asn Val Ser Pro Asp Thr Leu Asn Leu Glu Gly Cys Lys Asn Tyr Asp
            420                 425                 430

Ile Ala Pro Gln Val Gly His Lys Phe Cys Lys Asp Ile Pro Gly Phe
        435                 440                 445

Ile Pro Ser Leu Leu Gly His Leu Leu Glu Glu Arg Gln Lys Ile Lys
    450                 455                 460

Thr Lys Met Lys Glu Thr Gln Asp Pro Ile Glu Lys Ile Leu Leu Asp
465                 470                 475                 480

Tyr Arg Gln Lys Ala Ile Lys Leu Leu Ala Asn Ser Phe Tyr Gly Tyr
                485                 490                 495

Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu Ser
            500                 505                 510

Val Thr Ala Trp Gly Arg Lys Tyr Ile Glu Leu Val Trp Lys Glu Leu
        515                 520                 525

Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ile Asp Thr Asp Gly Leu
    530                 535                 540

Tyr Ala Thr Ile Pro Gly Gly Glu Ser Glu Glu Ile Lys Lys Lys Ala
545                 550                 555                 560

Leu Glu Phe Val Lys Tyr Ile Asn Ser Lys Leu Pro Gly Leu Leu Glu
                565                 570                 575

Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys Lys
            580                 585                 590

Arg Tyr Ala Val Ile Asp Glu Glu Gly Lys Val Ile Thr Arg Gly Leu
        595                 600                 605

Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala
    610                 615                 620

Arg Val Leu Glu Thr Ile Leu Lys His Gly Asp Val Glu Glu Ala Val
625                 630                 635                 640

Arg Ile Val Lys Glu Val Ile Gln Lys Leu Ala Asn Tyr Glu Ile Pro
                645                 650                 655

Pro Glu Lys Leu Ala Ile Tyr Glu Gln Ile Thr Arg Pro Leu His Glu
            660                 665                 670
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Tyr Lys Ala Ile Gly Pro His Val Ala Val Ala Lys Lys Leu Ala Ala
675 680 685

Lys Gly Val Lys Ile Lys Pro Gly Met Val Ile Gly Tyr Ile Val Leu
690 695 700

Arg Gly Asp Gly Pro Ile Ser Asn Arg Ala Ile Leu Ala Glu Glu Tyr
705 710 715 720

Asp Pro Lys Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln
725 730 735

Val Leu Pro Ala Val Leu Arg Ile Leu Glu Gly Phe Gly Tyr Arg Lys
740 745 750

Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Thr Ser Trp
755 760 765

Leu Asn Ile Lys Lys Ser
770

<210> 36
<211> 772
<212> PRT
<213> Pyrococcus furiosus

<400> 36

Met Ile Leu Asp Val Asp Tyr Ile Thr Glu Glu Gly Lys Pro Val Ile
1 5 10 15

Arg Leu Phe Lys Lys Glu Asn Gly Lys Phe Lys Ile Glu His Asp Arg
20 25 30

Thr Phe Arg Pro Tyr Ile Tyr Ala Leu Leu Arg Asp Asp Ser Lys Ile
35 40 45

Glu Glu Val Lys Lys Ile Thr Gly Glu Arg His Gly Lys Ile Val Arg
50 55 60

Ile Val Asp Val Glu Lys Val Glu Lys Lys Phe Leu Gly Lys Pro Ile
65 70 75 80

Thr Val Trp Lys Leu Tyr Leu Glu His Pro Gln Thr Ile Arg Glu Lys
85 90 95

Val Arg Glu His Pro Ala Val Val Asp Ile Phe Glu Tyr Asp Ile Pro
100 105 110

Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro Met Glu Gly
115 120 125

Glu Glu Glu Leu Lys Ile Leu Ala Phe Asp Ile Glu Thr Leu Tyr His
130 135 140

Glu Gly Glu Glu Phe Gly Lys Gly Pro Ile Ile Met Ile Ser Tyr Ala
145 150 155 160

Asp Glu Asn Glu Ala Lys Val Ile Thr Trp Lys Asn Ile Asp Leu Pro
165 170 175

Tyr Val Glu Val Val Ser Ser Glu Arg Glu Met Ile Lys Arg Phe Leu
180 185 190

Arg Ile Ile Arg Glu Lys Asp Pro Asp Ile Ile Val Thr Tyr Asn Gly
195 200 205

Asp Ser Phe Asp Phe Pro Tyr Leu Ala Lys Arg Ala Glu Lys Leu Gly
210 215 220

Ile Lys Leu Thr Ile Gly Arg Asp Gly Ser Glu Pro Lys Met Gln Arg
225 230 235 240

Ile Gly Asp Met Thr Ala Val Glu Val Lys Gly Arg Ile His Phe Asp
245 250 255

Leu Tyr His Val Ile Thr Arg Thr Ile Asn Leu Pro Thr Tyr Thr Leu
260 265 270

Glu Ala Val Tyr Glu Ala Ile Phe Gly Lys Pro Lys Glu Lys Val Tyr
275 280 285

Ala Asp Glu Ile Ala Lys Ala Trp Glu Ser Gly Glu Asn Leu Glu Arg
290 295 300

Val Ala Lys Tyr Ser Met Glu Asp Ala Lys Ala Thr Tyr Glu Leu Gly
305 310 315 320

Lys Glu Phe Leu Pro Met Glu Ile Gln Leu Ser Arg Leu Val Gly Gln
325 330 335

Pro Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu Val Glu Trp
340 345 350

Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Val Ala Pro Asn Lys
355 360 365

Pro Ser Glu Glu Glu Tyr Gln Arg Arg Leu Arg Glu Ser Tyr Thr Gly
370 375 380

Gly Phe Val Lys Glu Pro Glu Lys Gly Leu Trp Glu Asn Ile Val Tyr
385 390 395 400

Leu Asp Phe Arg Ala Leu Tyr Pro Ser Ile Ile Ile Thr His Asn Val
405 410 415

Ser Pro Asp Thr Leu Asn Leu Glu Gly Cys Lys Asn Tyr Asp Ile Ala
420 425 430

Pro Gln Val Gly His Lys Phe Cys Lys Asp Ile Pro Gly Phe Ile Pro
435 440 445

Ser Leu Leu Gly His Leu Leu Glu Glu Arg Gln Lys Ile Lys Thr Lys
450 455 460

Met Lys Glu Thr Gln Asp Pro Ile Glu Lys Ile Leu Leu Asp Tyr Arg
465 470 475 480

Gln Lys Ala Ile Lys Leu Leu Ala Asn Ser Phe Tyr Gly Tyr Tyr Gly
485 490 495

Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu Ser Val Thr
500 505 510

Ala Trp Gly Arg Lys Tyr Ile Glu Leu Val Trp Lys Glu Leu Glu Glu
515 520 525

Lys Phe Gly Phe Lys Val Leu Tyr Ile Asp Thr Asp Gly Leu Tyr Ala
530 535 540

Thr Ile Pro Gly Gly Glu Ser Glu Glu Ile Lys Lys Lys Ala Leu Glu
545 550 555 560

Phe Val Lys Tyr Ile Asn Ser Lys Leu Pro Gly Leu Leu Glu Leu Glu
565 570 575

Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys Lys Arg Tyr
580 585 590

Ala Val Ile Asp Glu Glu Gly Lys Val Ile Thr Arg Gly Leu Glu Ile
595 600 605

Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala Arg Val

610 615 620

Leu Glu Thr Ile Leu Lys His Gly Asp Val Glu Glu Ala Val Arg Ile
625 630 635 640

Val Lys Glu Val Ile Gln Lys Leu Ala Asn Tyr Glu Ile Pro Pro Glu
645 650 655

Lys Leu Ala Ile Tyr Glu Gln Ile Thr Arg Pro Leu His Glu Tyr Lys
660 665 670

Ala Ile Gly Pro His Val Ala Val Ala Lys Lys Leu Ala Ala Lys Gly
675 680 685

Val Lys Ile Lys Pro Gly Met Val Ile Gly Tyr Ile Val Leu Arg Gly
690 695 700

Asp Gly Pro Ile Ser Asn Arg Ala Ile Leu Ala Glu Glu Tyr Asp Pro
705 710 715 720

Lys Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln Val Leu
725 730 735

Pro Ala Val Leu Arg Ile Leu Glu Gly Phe Gly Tyr Arg Lys Glu Asp
740 745 750

Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Thr Ser Trp Leu Asn
755 760 765

Ile Lys Lys Ser
770

<210> 37
<211> 2322
<212> DNA
<213> Thermococcus gorgonarius

<220>
<221> CDS
<222> (1)..(2322)

<220>
<221> misc_feature
<222> (277)..(279)
<223> Tgo93 (R): nnn = AGA, AGG, CGA, CGC, CGG, CGT; Tgo 93 (E): nnn = GAA, GAG; Tgo93 (D): nnn = GAT, GAC (D) ;Tgo93 (K): nnn = AAA, AAG (K) ; Tgo93 (Q): nnn = CAA, CAG (Q) ; Tgo93 (N): nnn = AAC, AAU (N)

<400> 37
atg atc ctc gat aca gac tac ata act gag gat gga aag ccc gtc atc 48

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Met Ile Leu Asp Thr Asp Tyr Ile Thr Glu Asp Gly Lys Pro Val Ile
1               5                  10                  15

agg atc ttc aag aag gag aac ggc gag ttc aaa ata gac tac gac aga      96
Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Asp Tyr Asp Arg
            20                  25                  30

aac ttt gag cca tac atc tac gcg ctc ttg aag gac gac tct gcg att     144
Asn Phe Glu Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
        35                  40                  45

gag gac gtc aag aag ata act gcc gag agg cac ggc act acc gtt agg     192
Glu Asp Val Lys Lys Ile Thr Ala Glu Arg His Gly Thr Thr Val Arg
    50                  55                  60

gtt gtc agg gcc gag aaa gtg aag aag aag ttc cta ggc agg ccg ata     240
Val Val Arg Ala Glu Lys Val Lys Lys Lys Phe Leu Gly Arg Pro Ile
65                  70                  75                  80

gag gtc tgg aag ctc tac ttc act cac ccc cag gac nnn ccc gca atc     288
Glu Val Trp Lys Leu Tyr Phe Thr His Pro Gln Asp Xaa Pro Ala Ile
                85                  90                  95

agg gac aag ata aag gag cat cct gcc gtt gtg gac atc tac gag tac     336
Arg Asp Lys Ile Lys Glu His Pro Ala Val Val Asp Ile Tyr Glu Tyr
            100                 105                 110

gac atc ccc ttc gcg aag cgc tac ctc ata gac aaa ggc tta atc ccg     384
Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
        115                 120                 125

atg gag ggc gac gag gaa ctt aag atg ctc gcc ttc gac atc gag acg     432
Met Glu Gly Asp Glu Glu Leu Lys Met Leu Ala Phe Asp Ile Glu Thr
    130                 135                 140

ctc tat cac gag ggc gag gag ttc gcc gaa ggg cct atc ctg atg ata     480
Leu Tyr His Glu Gly Glu Glu Phe Ala Glu Gly Pro Ile Leu Met Ile
145                 150                 155                 160

agc tac gcc gac gag gaa ggg gcg cgc gtt att acc tgg aag aat atc     528
Ser Tyr Ala Asp Glu Glu Gly Ala Arg Val Ile Thr Trp Lys Asn Ile
                165                 170                 175

gac ctt ccc tat gtc gac gtc gtt tcc acc gag aag gag atg ata aag     576
Asp Leu Pro Tyr Val Asp Val Val Ser Thr Glu Lys Glu Met Ile Lys
            180                 185                 190

cgc ttc ctc aag gtc gtc aag gaa aag gat ccc gac gtc ctc ata acc     624
Arg Phe Leu Lys Val Val Lys Glu Lys Asp Pro Asp Val Leu Ile Thr
        195                 200                 205

tac aac ggc gac aac ttc gac ttc gcc tac ctc aag aag cgc tcc gag     672
Tyr Asn Gly Asp Asn Phe Asp Phe Ala Tyr Leu Lys Lys Arg Ser Glu
    210                 215                 220

aag ctc gga gtc aag ttc atc ctc gga agg gaa ggg agc gag ccg aaa     720
Lys Leu Gly Val Lys Phe Ile Leu Gly Arg Glu Gly Ser Glu Pro Lys
225                 230                 235                 240

atc cag cgc atg ggc gat cgc ttt gcg gtg gag gtc aag gga agg att     768
Ile Gln Arg Met Gly Asp Arg Phe Ala Val Glu Val Lys Gly Arg Ile
                245                 250                 255
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cac ttc gac ctc tac ccc gtc att agg aga acg att aac ctc ccc act      816
His Phe Asp Leu Tyr Pro Val Ile Arg Arg Thr Ile Asn Leu Pro Thr
            260                 265                 270

tac acc ctt gag gca gta tat gaa gcc atc ttt gga cag ccg aag gag      864
Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Gln Pro Lys Glu
        275                 280                 285

aag gtc tac gct gag gag ata gcg cag gcc tgg gaa acg ggc gag gga      912
Lys Val Tyr Ala Glu Glu Ile Ala Gln Ala Trp Glu Thr Gly Glu Gly
    290                 295                 300

tta gaa agg gtg gcc cgc tac tcg atg gag gac gca aag gta acc tat      960
Leu Glu Arg Val Ala Arg Tyr Ser Met Glu Asp Ala Lys Val Thr Tyr
305                 310                 315                 320

gaa ctc gga aaa gag ttc ttc cct atg gaa gcc cag ctc tcg cgc ctc     1008
Glu Leu Gly Lys Glu Phe Phe Pro Met Glu Ala Gln Leu Ser Arg Leu
                325                 330                 335

gta ggc cag agc ctc tgg gat gta tct cgc tcg agt acc gga aac ctc     1056
Val Gly Gln Ser Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
            340                 345                 350

gtc gag tgg ttt ttg ctg agg aag gcc tac gag agg aat gaa ctt gca     1104
Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Leu Ala
        355                 360                 365

cca aac aag ccg gac gag agg gag ctg gca aga aga agg gag agc tac     1152
Pro Asn Lys Pro Asp Glu Arg Glu Leu Ala Arg Arg Arg Glu Ser Tyr
    370                 375                 380

gcg ggt gga tac gtc aag gag ccc gaa agg gga ctg tgg gag aac atc     1200
Ala Gly Gly Tyr Val Lys Glu Pro Glu Arg Gly Leu Trp Glu Asn Ile
385                 390                 395                 400

gtg tat ctg gac ttc cgc tcc ctg tat cct tcg ata ata atc acc cat     1248
Val Tyr Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile Ile Thr His
                405                 410                 415

aac gtc tcc cct gat aca ctc aac agg gag ggt tgt gag gag tac gac     1296
Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Gly Cys Glu Glu Tyr Asp
            420                 425                 430

gtg gct cct cag gta ggc cat aag ttc tgc aag gac ttc ccc ggc ttc     1344
Val Ala Pro Gln Val Gly His Lys Phe Cys Lys Asp Phe Pro Gly Phe
        435                 440                 445

atc cca agc ctc ctc gga gac ctc ttg gag gag aga cag aag gta aag     1392
Ile Pro Ser Leu Leu Gly Asp Leu Leu Glu Glu Arg Gln Lys Val Lys
    450                 455                 460

aag aag atg aag gcc act ata gac cca atc gag aag aaa ctc ctc gat     1440
Lys Lys Met Lys Ala Thr Ile Asp Pro Ile Glu Lys Lys Leu Leu Asp
465                 470                 475                 480

tac agg caa cga gca atc aaa atc ctt gct aat agc ttc tac ggt tac     1488
Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Phe Tyr Gly Tyr
                485                 490                 495

tac ggc tat gca aag gcc cgc tgg tac tgc aag gag tgc gcc gag agc     1536
Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu Ser
            500                 505                 510
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gtt acc gct tgg ggc agg cag tac atc gag acc acg ata agg gaa ata      1584
Val Thr Ala Trp Gly Arg Gln Tyr Ile Glu Thr Thr Ile Arg Glu Ile
        515                 520                 525

gag gag aaa ttt ggc ttt aaa gtc ctc tac gcg gac aca gat gga ttt      1632
Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ala Asp Thr Asp Gly Phe
    530                 535                 540

ttc gca aca ata cct gga gcg gac gcc gaa acc gtc aaa aag aag gca      1680
Phe Ala Thr Ile Pro Gly Ala Asp Ala Glu Thr Val Lys Lys Lys Ala
545                 550                 555                 560

aag gag ttc ctg gac tac atc aac gcc aaa ctg ccc ggc ctg ctc gaa      1728
Lys Glu Phe Leu Asp Tyr Ile Asn Ala Lys Leu Pro Gly Leu Leu Glu
                565                 570                 575

ctc gaa tac gag ggc ttc tac aag cgc ggc ttc ttc gtg acg aag aag      1776
Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys Lys
            580                 585                 590

aag tac gcg gtt ata gac gag gag gac aag ata acg acg cgc ggg ctt      1824
Lys Tyr Ala Val Ile Asp Glu Glu Asp Lys Ile Thr Thr Arg Gly Leu
        595                 600                 605

gaa ata gtt agg cgt gac tgg agc gag ata gcg aag gag acg cag gcg      1872
Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala
    610                 615                 620

agg gtt ctt gag gcg ata cta aag cac ggt gac gtt gaa gaa gcg gta      1920
Arg Val Leu Glu Ala Ile Leu Lys His Gly Asp Val Glu Glu Ala Val
625                 630                 635                 640

agg att gtc aaa gag gtt acg gag aag ctg agc aag tac gag gtt cca      1968
Arg Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Val Pro
                645                 650                 655

ccg gag aag ctg gtc atc tac gag cag ata acc cgc gac ctg aag gac      2016
Pro Glu Lys Leu Val Ile Tyr Glu Gln Ile Thr Arg Asp Leu Lys Asp
            660                 665                 670

tac aag gcc acc ggg ccg cat gtg gct gtt gca aaa cgc ctc gcc gca      2064
Tyr Lys Ala Thr Gly Pro His Val Ala Val Ala Lys Arg Leu Ala Ala
        675                 680                 685

agg ggg ata aaa atc cgg ccc gga acg gtc ata agc tac atc gtg ctc      2112
Arg Gly Ile Lys Ile Arg Pro Gly Thr Val Ile Ser Tyr Ile Val Leu
    690                 695                 700

aaa ggc tcg gga agg att ggg gac agg gct ata ccc ttt gac gaa ttt      2160
Lys Gly Ser Gly Arg Ile Gly Asp Arg Ala Ile Pro Phe Asp Glu Phe
705                 710                 715                 720

gac ccg gca aag cac aag tac gat gca gaa tac tac atc gag aac cag      2208
Asp Pro Ala Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln
                725                 730                 735

gtt ctt cca gct gtg gag agg att ctg agg gcc ttt ggt tac cgt aaa      2256
Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys
            740                 745                 750

gaa gat tta agg tat cag aaa acg cgg cag gtt ggc ttg ggg gcg tgg      2304
Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Gly Ala Trp
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755 760 765

cta aaa cct aag aca tga 2322
Leu Lys Pro Lys Thr
770

<210> 38
<211> 773
<212> PRT
<213> Thermococcus gorgonarius

<220>
<221> misc_feature
<222> (93)..(93)
<223> The 'Xaa' at location 93 stands for Lys, Asn, Arg, Ser, Thr, Ile, Met, Glu, Asp, Gly, Ala, Val, Gln, His, Pro, Leu, Tyr, Trp, Cys, or Phe.

<400> 38

Met Ile Leu Asp Thr Asp Tyr Ile Thr Glu Asp Gly Lys Pro Val Ile
1 5 10 15

Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Asp Tyr Asp Arg
20 25 30

Asn Phe Glu Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
35 40 45

Glu Asp Val Lys Lys Ile Thr Ala Glu Arg His Gly Thr Thr Val Arg
50 55 60

Val Val Arg Ala Glu Lys Val Lys Lys Lys Phe Leu Gly Arg Pro Ile
65 70 75 80

Glu Val Trp Lys Leu Tyr Phe Thr His Pro Gln Asp Xaa Pro Ala Ile
85 90 95

Arg Asp Lys Ile Lys Glu His Pro Ala Val Val Asp Ile Tyr Glu Tyr
100 105 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
115 120 125

Met Glu Gly Asp Glu Glu Leu Lys Met Leu Ala Phe Asp Ile Glu Thr
130 135 140

Leu Tyr His Glu Gly Glu Glu Phe Ala Glu Gly Pro Ile Leu Met Ile
145 150 155 160

Ser Tyr Ala Asp Glu Glu Gly Ala Arg Val Ile Thr Trp Lys Asn Ile
165 170 175

Asp Leu Pro Tyr Val Asp Val Val Ser Thr Glu Lys Glu Met Ile Lys
180 185 190

Arg Phe Leu Lys Val Val Lys Glu Lys Asp Pro Asp Val Leu Ile Thr
195 200 205

Tyr Asn Gly Asp Asn Phe Asp Phe Ala Tyr Leu Lys Lys Arg Ser Glu
210 215 220

Lys Leu Gly Val Lys Phe Ile Leu Gly Arg Glu Gly Ser Glu Pro Lys
225 230 235 240

Ile Gln Arg Met Gly Asp Arg Phe Ala Val Glu Val Lys Gly Arg Ile
245 250 255

His Phe Asp Leu Tyr Pro Val Ile Arg Arg Thr Ile Asn Leu Pro Thr
260 265 270

Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Gln Pro Lys Glu
275 280 285

Lys Val Tyr Ala Glu Glu Ile Ala Gln Ala Trp Glu Thr Gly Glu Gly
290 295 300

Leu Glu Arg Val Ala Arg Tyr Ser Met Glu Asp Ala Lys Val Thr Tyr
305 310 315 320

Glu Leu Gly Lys Glu Phe Phe Pro Met Glu Ala Gln Leu Ser Arg Leu
325 330 335

Val Gly Gln Ser Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
340 345 350

Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Leu Ala
355 360 365

Pro Asn Lys Pro Asp Glu Arg Glu Leu Ala Arg Arg Arg Glu Ser Tyr
370 375 380

Ala Gly Gly Tyr Val Lys Glu Pro Glu Arg Gly Leu Trp Glu Asn Ile
385 390 395 400

Val Tyr Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile Ile Thr His
405 410 415

Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Gly Cys Glu Glu Tyr Asp

420 425 430

Val Ala Pro Gln Val Gly His Lys Phe Cys Lys Asp Phe Pro Gly Phe
435 440 445

Ile Pro Ser Leu Leu Gly Asp Leu Leu Glu Glu Arg Gln Lys Val Lys
450 455 460

Lys Lys Met Lys Ala Thr Ile Asp Pro Ile Glu Lys Lys Leu Leu Asp
465 470 475 480

Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Phe Tyr Gly Tyr
485 490 495

Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu Ser
500 505 510

Val Thr Ala Trp Gly Arg Gln Tyr Ile Glu Thr Thr Ile Arg Glu Ile
515 520 525

Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ala Asp Thr Asp Gly Phe
530 535 540

Phe Ala Thr Ile Pro Gly Ala Asp Ala Glu Thr Val Lys Lys Lys Ala
545 550 555 560

Lys Glu Phe Leu Asp Tyr Ile Asn Ala Lys Leu Pro Gly Leu Leu Glu
565 570 575

Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys Lys
580 585 590

Lys Tyr Ala Val Ile Asp Glu Glu Asp Lys Ile Thr Thr Arg Gly Leu
595 600 605

Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala
610 615 620

Arg Val Leu Glu Ala Ile Leu Lys His Gly Asp Val Glu Glu Ala Val
625 630 635 640

Arg Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Val Pro
645 650 655

Pro Glu Lys Leu Val Ile Tyr Glu Gln Ile Thr Arg Asp Leu Lys Asp
660 665 670

Tyr Lys Ala Thr Gly Pro His Val Ala Val Ala Lys Arg Leu Ala Ala
675 680 685

Arg Gly Ile Lys Ile Arg Pro Gly Thr Val Ile Ser Tyr Ile Val Leu
690 695 700

Lys Gly Ser Gly Arg Ile Gly Asp Arg Ala Ile Pro Phe Asp Glu Phe
705 710 715 720

Asp Pro Ala Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln
725 730 735

Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys
740 745 750

Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Gly Ala Trp
755 760 765

Leu Lys Pro Lys Thr
770

<210> 39
<211> 775
<212> PRT
<213> Pyrococcus furiosus

<400> 39

Met Ile Leu Asp Val Asp Tyr Ile Thr Glu Glu Gly Lys Pro Val Ile
1 5 10 15

Arg Leu Phe Lys Lys Glu Asn Gly Lys Phe Lys Ile Glu His Asp Arg
20 25 30

Thr Phe Arg Pro Tyr Ile Tyr Ala Leu Leu Arg Asp Asp Ser Lys Ile
35 40 45

Glu Glu Val Lys Lys Ile Thr Gly Glu Arg His Gly Lys Ile Val Arg
50 55 60

Ile Val Asp Val Glu Lys Val Glu Lys Lys Phe Leu Gly Lys Pro Ile
65 70 75 80

Thr Val Trp Lys Leu Tyr Leu Glu His Pro Gln Asp Val Pro Thr Ile
85 90 95

Arg Glu Lys Val Arg Glu His Pro Ala Val Val Asp Ile Phe Glu Tyr
100 105 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
115 120 125

Met Glu Gly Glu Glu Glu Leu Lys Ile Leu Ala Phe Asp Ile Glu Thr
130 135 140

Leu Tyr His Glu Gly Glu Glu Phe Gly Lys Gly Pro Ile Ile Met Ile
145 150 155 160

Ser Tyr Ala Asp Glu Asn Glu Ala Lys Val Ile Thr Trp Lys Asn Ile
165 170 175

Asp Leu Pro Tyr Val Glu Val Val Ser Ser Glu Arg Glu Met Ile Lys
180 185 190

Arg Phe Leu Arg Ile Ile Arg Glu Lys Asp Pro Asp Ile Ile Val Thr
195 200 205

Tyr Asn Gly Asp Ser Phe Asp Phe Pro Tyr Leu Ala Lys Arg Ala Glu
210 215 220

Lys Leu Gly Ile Lys Leu Thr Ile Gly Arg Asp Gly Ser Glu Pro Lys
225 230 235 240

Met Gln Arg Ile Gly Asp Met Thr Ala Val Glu Val Lys Gly Arg Ile
245 250 255

His Phe Asp Leu Tyr His Val Ile Thr Arg Thr Ile Asn Leu Pro Thr
260 265 270

Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Lys Pro Lys Glu
275 280 285

Lys Val Tyr Ala Asp Glu Ile Ala Lys Ala Trp Glu Ser Gly Glu Asn
290 295 300

Leu Glu Arg Val Ala Lys Tyr Ser Met Glu Asp Ala Lys Ala Thr Tyr
305 310 315 320

Glu Leu Gly Lys Glu Phe Leu Pro Met Glu Ile Gln Leu Ser Arg Leu
325 330 335

Val Gly Gln Pro Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
340 345 350

Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Val Ala
355 360 365

Pro Asn Lys Pro Ser Glu Glu Glu Tyr Gln Arg Arg Leu Arg Glu Ser
370 375 380

Tyr Thr Gly Gly Phe Val Lys Glu Pro Glu Lys Gly Leu Trp Glu Asn
385 390 395 400

Ile Val Tyr Leu Asp Phe Arg Ala Leu Tyr Pro Ser Ile Ile Ile Thr
405 410 415

His Asn Val Ser Pro Asp Thr Leu Asn Leu Glu Gly Cys Lys Asn Tyr
420 425 430

Asp Ile Ala Pro Gln Val Gly His Lys Phe Cys Lys Asp Ile Pro Gly
435 440 445

Phe Ile Pro Ser Leu Leu Gly His Leu Leu Glu Glu Arg Gln Lys Ile
450 455 460

Lys Thr Lys Met Lys Glu Thr Gln Asp Pro Ile Glu Lys Ile Leu Leu
465 470 475 480

Asp Tyr Arg Gln Lys Ala Ile Lys Leu Leu Ala Asn Ser Phe Tyr Gly
485 490 495

Tyr Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu
500 505 510

Ser Val Thr Ala Trp Gly Arg Lys Tyr Ile Glu Leu Val Trp Lys Glu
515 520 525

Leu Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ile Asp Thr Asp Gly
530 535 540

Leu Tyr Ala Thr Ile Pro Gly Gly Glu Ser Glu Glu Ile Lys Lys Lys
545 550 555 560

Ala Leu Glu Phe Val Lys Tyr Ile Asn Ser Lys Leu Pro Gly Leu Leu
565 570 575

Glu Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys
580 585 590

Lys Arg Tyr Ala Val Ile Asp Glu Glu Gly Lys Val Ile Thr Arg Gly
595 600 605

Leu Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln
610 615 620

Ala Arg Val Leu Glu Thr Ile Leu Lys His Gly Asp Val Glu Glu Ala
625 630 635 640

Val Arg Ile Val Lys Glu Val Ile Gln Lys Leu Ala Asn Tyr Glu Ile
645 650 655

Pro Pro Glu Lys Leu Ala Ile Tyr Glu Gln Ile Thr Arg Pro Leu His
660 665 670

Glu Tyr Lys Ala Ile Gly Pro His Val Ala Val Ala Lys Lys Leu Ala
675 680 685

Ala Lys Gly Val Lys Ile Lys Pro Gly Met Val Ile Gly Tyr Ile Val
690 695 700

Leu Arg Gly Asp Gly Pro Ile Ser Asn Arg Ala Ile Leu Ala Glu Glu
705 710 715 720

Tyr Asp Pro Lys Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn
725 730 735

Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Gly Phe Gly Tyr Arg
740 745 750

Lys Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Thr Ser
755 760 765

Trp Leu Asn Ile Lys Lys Ser
770 775

<210> 40
<211> 3499
<212> DNA
<213> Pyrococcus furiosus

<220>
<221> misc_feature
<222> (2788)..(2789)
<223> n= A, T, G or C

<220>
<221> misc_feature
<222> (3287)..(3289)
<223> n= A, T, G or C

<220>
<221> misc_feature
<222> (3290)..(3292)
<223> n= A, T, G or C

<220>
<221> misc_feature
<222> (3473)..(3473)
<223> n= A, T, G or C

<220>
<221> misc_feature
<222> (3478)..(3478)
<223> n= A, T, G or C

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ccctggtcct gggtccacat atatgttctt actcgccttt atgaagaatc ccccagtcgc 60

tctaacctgg gttatagtga caaatcttcc tccaccaccg cccaagaagg ttatttctat 120

caactctaca cctcccctat tttctctctt atgagatttt taagtatagt tatagagaag 180

gttttatact ccaaactgag ttagtagata tgtggggagc ataatgattt tagatgtgga 240

ttacataact gaagaaggaa aacctgttat taggctattc aaaaaagaga acggaaaatt 300

taagatagag catgatagaa cttttagacc atacatttac gctcttctca gggatgattc 360

aaagattgaa gaagttaaga aaataacggg ggaaaggcat ggaaagattg tgagaattgt 420

tgatgtagag aaggttgaga aaaagtttct cggcaagcct attaccgtgt ggaaacttta 480

tttggaacat ccccaagatg ttcccactat tagagaaaaa gttagagaac atccagcagt 540

tgtggacatc ttcgaatacg atattccatt tgcaaagaga tacctcatcg acaaaggcct 600

aataccaatg gaggggggaag aagagctaaa gattcttgcc ttcgatatag aaaccctcta 660

tcacgaagga gaagagtttg gaaaaggccc aattataatg attagttatg cagatgaaaa 720

tgaagcaaag gtgattactt ggaaaaacat agatcttcca tacgttgagg ttgtatcaag 780

cgagagagag atgataaaga gatttctcag gattatcagg gagaaggatc ctgacattat 840

agttacttat aatggagact cattcgactt cccatattta gcgaaaaggg cagaaaaact 900

tgggattaaa ttaaccattg gaagagatgg aagcgagccc aagatgcaga gaataggcga 960

tatgacggct gtagaagtca agggaagaat acatttcgac ttgtatcatg taataacaag 1020

gacaataaat ctcccaacat acacactaga ggctgtatat gaagcaattt ttggaaagcc 1080

aaaggagaag gtatacgccg acgagatagc aaaagcctgg gaaagtggag agaaccttga 1140

gagagttgcc aaatactcga tggaagatgc aaaggcaact tatgaactcg ggaaagaatt 1200

ccttccaatg gaaattcagc tttcaagatt agttggacaa cctttatggg atgtttcaag 1260

gtcaagcaca gggaaccttg tagagtggtt cttacttagg aaagcctacg aaagaaacga 1320

agtagctcca aacaagccaa gtgaagagga gtatcaaaga aggctcaggg agagctacac 1380

aggtggattc gttaaagagc cagaaaaggg gttgtgggaa aacatagtat acctagattt 1440

tagagcccta tatccctcga ttataattac ccacaatgtt tctcccgata ctctaaatct 1500

tgagggatgc aagaactatg atatcgctcc tcaagtaggc cacaagttct gcaaggacat 1560

ccctggtttt ataccaagtc tcttgggaca tttgttagag gaaagacaaa agattaagac 1620

aaaaatgaag gaaactcaag atcctataga aaaaatactc cttgactata gacaaaaagc 1680

gataaaactc ttagcaaatt ctttctacgg atattatggc tatgcaaaag caagatggta 1740

ctgtaaggag tgtgctgaga gcgttactgc ctggggaaga aagtacatcg agttagtatg 1800

gaaggagctc gaagaaaagt ttggatttaa agtcctctac attgacactg atggtctcta 1860

tgcaactatc ccaggaggag aaagtgagga aataaagaaa aaggctctag aatttgtaaa 1920

atacataaat tcaaagctcc ctggactgct agagcttgaa tatgaagggt tttataagag 1980

gggattcttc gttacgaaga agaggtatgc agtaatagat gaagaaggaa aagtcattac 2040

tcgtggttta gagatagtta ggagagattg gagtgaaatt gcaaaagaaa ctcaagctag 2100

agttttggag acaatactaa aacacggaga tgttgaagaa gctgtgagaa tagtaaaaga 2160

agtaatacaa aagcttgcca attatgaaat tccaccagag aagctcgcaa tatatgagca 2220

gataacaaga ccattacatg agtataaggc gataggtcct cacgtagctg ttgcaaagaa 2280

actagctgct aaaggagtta aaataaagcc aggaatggta attggataca tagtacttag 2340

aggcgatggt ccaattagca atagggcaat tctagctgag gaatacgatc ccaaaaagca 2400

caagtatgac gcagaatatt acattgagaa ccaggttctt ccagcggtac ttaggatatt 2460

ggagggattt ggatacagaa aggaagacct cagataccaa aagacaagac aagtcggcct 2520

aacttcctgg cttaacatta aaaaatccta gaaaagcgat agatatcaac ttttattctt 2580

tctaaccttt ttctatgaaa gaagaactga gcaggaatta ccagttcttc cgttatttta 2640

tgggtaatta aaaacccatg ctcttgggag aatcttcgaa taaaatccct aacttcaggc 2700

tttgctaagt gaatagaata aacaacatca ctcacttcaa acgccttcgt tagaaatggt 2760

ctatctgcat gcttctctgg ctcggaanng gaggattcat aacaacagta tcaacattct 2820

cagagaattg agaaacatca gaaactttga cttctacaac atttctaact ttgcaactct 2880

tcaagatttt ctaaaagaat tttaacggcc tcctcgtcaa tttcgacgac gtagatcttt 2940

tttgctccaa gcagagccgc tccaatggat aacacccctg ttcccgcacc caagtccgct 3000

acaatttttt ccttgtatct cctaatgtat aagcaagcca aaggagagta gatgctacct 3060

ttccgggagt tttgtattgc tctagccaag gtttgggatt tttgaatcct ttaactctgg 3120

aaagtataat ttcaagctcc ttcttcttca tgacagatga aaaattgttt tgtctctttt 3180

taacttttac agaaataact gtctcaaatt atgacaactc ttgacatttt tacttcatta 3240

ccagggtaat gtttttaagt atgaaatttt tctttcatag aggaggnnnn nngtcctctc 3300

ctcgatttcc ttggttgtgc tccatatgat aagcttccaa agtgggtgtt cagactttta 3360

gacactcaaa taccagacga caatggtgtg ctcactcaag ccccatatgg gttgagaaaa 3420

gtagaagcgg cactactcag atgcttcccc aggaatgagg ttgttgtagc tcntcccnga 3480

aagattgaga tgttcttgg 3499

<210> 41
<211> 25
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 41
ggaatgaagt tatccccgct tcccc 25

<210> 42
<211> 22
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 42
ccagttcatt cagcgtattc ag 22

<210> 43
<211> 31
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 43
gaacatcccc aagataaacc cactattaga g 31

<210> 44
<211> 31
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 44
ctctaatagt gggtttatct tggggatgtt c 31

<210> 45
<211> 37
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<220>
<221> misc_feature

<222> (1)..(1)
<223> 5' phosphate

<400> 45
gaacatcccc aagatgcacc cactattaga gaaaaag 37

<210> 46
<211> 37
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<220>
<221> misc_feature
<222> (1)..(1)
<223> 5'-phosphate

<400> 46
gaacatcccc aagatgaccc cactattaga gaaaaag 37

<210> 47
<211> 38
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<220>
<221> misc_feature
<222> (1)..(1)
<223> 5'-phosphate

<400> 47
gaacatcccc aagattgccc ccactattag agaaaaag 38

<210> 48
<211> 37
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<220>
<221> misc_feature
<222> (1)..(1)
<223> 5'-phosphate

<400> 48
gaacatcccc aagatatacc cactattaga gaaaaag 37

<210> 49
<211> 37

<212> DNA
<213> Artificial sequence

<220>
<223> primer

<220>
<221> misc_feature
<222> (1)..(1)
<223> 5'-phosphate

<400> 49
gaacatcccc aagatatgcc cactattaga gaaaaag 37

<210> 50
<211> 37
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<220>
<221> misc_feature
<222> (1)..(1)
<223> 5'-phosphate

<400> 50
gaacatcccc aagatttccc cactattaga gaaaaag 37

<210> 51
<211> 37
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<220>
<221> misc_feature
<222> (1)..(1)
<223> 5'-phosphate

<400> 51
gaacatcccc aagatcctcc cactattaga gaaaaag 37

<210> 52
<211> 37
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<220>
<221> misc_feature

<222> (1)..(1)
<223> 5'-phosphate

<400> 52
gaacatcccc aagatagccc cactattaga gaaaaag 37

<210> 53
<211> 37
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<220>
<221> misc_feature
<222> (1)..(1)
<223> 5'-phosphate

<400> 53
gaacatcccc aagatacacc cactattaga gaaaaag 37

<210> 54
<211> 37
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<220>
<221> misc_feature
<222> (1)..(1)
<223> 5'-phosphate

<400> 54
gaacatcccc aagattaccc cactattaga gaaaaag 37

<210> 55
<211> 37
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<220>
<221> misc_feature
<222> (1)..(1)
<223> 5'-phosphate

<400> 55
gaacatcccc aagattggcc cactattaga gaaaaag 37

<210> 56
<211> 35

<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 56
ctcatccgca ggaccagcca gcgataaggg acaag 35

<210> 57
<211> 35
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 57
ctcatccgca ggaccgtcca gcgataaggg acaag 35

<210> 58
<211> 35
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 58
ctcatccgca ggacaaacca gcgataaggg acaag 35

<210> 59
<211> 35
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 59
ctcatccgca ggacaatcca gcgataaggg acaag 35

<210> 60
<211> 35
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 60
ctcatccgca ggacgagcca gcgataaggg acaag 35

<210> 61
<211> 35
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 61
ctcatccgca ggacgatcca gcgataaggg acaag 35

<210> 62
<211> 34
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 62
caccccccagg accaacccgc aatcagggac aagg 34

<210> 63
<211> 34
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 63
caccccccagg acagacccgc aatcagggac aagg 34

<210> 64
<211> 34
<212> DNA
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<220>
<223> primer

<400> 64
caccccccagg acaatcccgc aatcagggac aagg 34

<210> 65
<211> 34
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 65
caccccccagg acaaacccgc aatcagggac aagg 34

<210> 66
<211> 34
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 66
cacccccagg acgaacccgc aatcagggac aagg 34

<210> 67
<211> 34
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 67
cacccccagg acgaccccgc aatcagggac aagg 34

<210> 68
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 68
acgcacccgc aggaccaacc ggcaatccgc gac 33

<210> 69
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 69
acgcacccgc aggaccgtcc ggcaatccgc gac 33

<210> 70
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 70
acgcacccgc aggacgagcc ggcaatccgc gac 33

<210> 71
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 71
acgcacccgc aggacgatcc ggcaatccgc gac 33

<210> 72
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 72
acgcacccgc aggacaaacc ggcaatccgc gac 33

<210> 73
<211> 28
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 73
gaacatcccc aagatcccac tattagag 28

<210> 74
<211> 22
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 74
gaacatcccc aaactattag ag 22

<210> 75
<211> 25
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<220>
<221> misc_feature
<222> (5)..(5)
<223> n = U

<220>
<221> misc_feature
<222> (10)..(10)
<223> n = U

<220>
<221> misc_feature
<222> (11)..(11)
<223> n = U

<220>
<221> misc_feature

<222> (13)..(13)
<223> n = U

<220>
<221> misc_feature
<222> (20)..(21)
<223> n = U

<400> 75
ggaangaagn nancccgcn ncccc 25

<210> 76
<211> 20
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<220>
<221> misc_feature
<222> (6)..(6)
<223> n = U

<220>
<221> misc_feature
<222> (8)..(8)
<223> n = U

<220>
<221> misc_feature
<222> (15)..(15)
<223> n = U

<400> 76
ccaggncncc agcgngccca 20

<210> 77
<211> 25
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 77
ggaatgaagt tatccccgct tcccc 25

<210> 78
<211> 20
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 78
ccaggtctcc agcgtgccca 20

<210> 79
<211> 23
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 79
gaggagagca ggaaaggtgg aac 23

<210> 80
<211> 24
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 80
tgcagagcga ttattcagga atgc 24

<210> 81
<211> 23
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 81
gaggagagca ggaaaggtgg aac 23

<210> 82
<211> 32
<212> DNA
<213> Artificial sequence

<220>
<223> primer

<400> 82
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<210> 83
<211> 774
<212> PRT
<213> Thermococcus litoralis

<400> 83

Met Ile Leu Asp Thr Asp Tyr Ile Thr Lys Asp Gly Lys Pro Ile Ile
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Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Glu Leu Asp Pro
20 25 30

His Phe Gln Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
35 40 45

Glu Glu Ile Lys Ala Ile Lys Gly Glu Arg His Gly Lys Thr Val Arg
50 55 60

Val Leu Asp Ala Val Lys Val Arg Lys Lys Phe Leu Gly Arg Glu Val
65 70 75 80

Glu Val Trp Lys Leu Ile Phe Glu His Pro Gln Asp Val Pro Ala Met
85 90 95

Arg Gly Lys Ile Arg Glu His Pro Ala Val Val Asp Ile Tyr Glu Tyr
100 105 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
115 120 125

Met Glu Gly Asp Glu Glu Leu Lys Leu Leu Ala Phe Asp Ile Glu Thr
130 135 140

Phe Tyr His Glu Gly Asp Glu Phe Gly Lys Gly Glu Ile Ile Met Ile
145 150 155 160

Ser Tyr Ala Asp Glu Glu Glu Ala Arg Val Ile Thr Trp Lys Asn Ile
165 170 175

Asp Leu Pro Tyr Val Asp Val Val Ser Asn Glu Arg Glu Met Ile Lys
180 185 190

Arg Phe Val Gln Val Val Lys Glu Lys Asp Pro Asp Val Ile Ile Thr
195 200 205

Tyr Asn Gly Asp Asn Phe Asp Leu Pro Tyr Leu Ile Lys Arg Ala Glu
210 215 220

Lys Leu Gly Val Arg Leu Val Leu Gly Arg Asp Lys Glu His Pro Glu
225 230 235 240

Pro Lys Ile Gln Arg Met Gly Asp Ser Phe Ala Val Glu Ile Lys Gly
245 250 255

Arg Ile His Phe Asp Leu Phe Pro Val Val Arg Arg Thr Ile Asn Leu
260 265 270

Pro Thr Tyr Thr Leu Glu Ala Val Tyr Glu Ala Val Leu Gly Lys Thr
275 280 285

Lys Ser Lys Leu Gly Ala Glu Glu Ile Ala Ala Ile Trp Glu Thr Glu
290 295 300

Glu Ser Met Lys Lys Leu Ala Gln Tyr Ser Met Glu Asp Ala Arg Ala
305 310 315 320

Thr Tyr Glu Leu Gly Lys Glu Phe Phe Pro Met Glu Ala Glu Leu Ala
325 330 335

Lys Leu Ile Gly Gln Ser Val Trp Asp Val Ser Arg Ser Ser Thr Gly
340 345 350

Asn Leu Val Glu Trp Tyr Leu Leu Arg Val Ala Tyr Ala Arg Asn Glu
355 360 365

Leu Ala Pro Asn Lys Pro Asp Glu Glu Glu Tyr Lys Arg Arg Leu Arg
370 375 380

Thr Thr Tyr Leu Gly Gly Tyr Val Lys Glu Pro Glu Lys Gly Leu Trp
385 390 395 400

Glu Asn Ile Ile Tyr Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile
405 410 415

Val Thr His Asn Val Ser Pro Asp Thr Leu Glu Lys Glu Gly Cys Lys
420 425 430

Asn Tyr Asp Val Ala Pro Ile Val Gly Tyr Arg Phe Cys Lys Asp Phe
435 440 445

Pro Gly Phe Ile Pro Ser Ile Leu Gly Asp Leu Ile Ala Met Arg Gln
450 455 460

Asp Ile Lys Lys Lys Met Lys Ser Thr Ile Asp Pro Ile Glu Lys Lys
465 470 475 480

Met Leu Asp Tyr Arg Gln Arg Ala Ile Lys Leu Leu Ala Asn Ser Tyr
485 490 495

Tyr Gly Tyr Met Gly Tyr Pro Lys Ala Arg Trp Tyr Ser Lys Glu Cys
500 505 510

Ala Glu Ser Val Thr Ala Trp Gly Arg His Tyr Ile Glu Met Thr Ile
515 520 525

Arg Glu Ile Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ala Asp Thr

530 535 540

Asp Gly Phe Tyr Ala Thr Ile Pro Gly Glu Lys Pro Glu Leu Ile Lys
545 550 555 560

Lys Lys Ala Lys Glu Phe Leu Asn Tyr Ile Asn Ser Lys Leu Pro Gly
565 570 575

Leu Leu Glu Leu Glu Tyr Glu Gly Phe Tyr Leu Arg Gly Phe Phe Val
580 585 590

Thr Lys Lys Arg Tyr Ala Val Ile Asp Glu Glu Gly Arg Ile Thr Thr
595 600 605

Arg Gly Leu Glu Val Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu
610 615 620

Thr Gln Ala Lys Val Leu Glu Ala Ile Leu Lys Glu Gly Ser Val Glu
625 630 635 640

Lys Ala Val Glu Val Val Arg Asp Val Val Glu Lys Ile Ala Lys Tyr
645 650 655

Arg Val Pro Leu Glu Lys Leu Val Ile His Glu Gln Ile Thr Arg Asp
660 665 670

Leu Lys Asp Tyr Lys Ala Ile Gly Pro His Val Ala Ile Ala Lys Arg
675 680 685

Leu Ala Ala Arg Gly Ile Lys Val Lys Pro Gly Thr Ile Ile Ser Tyr
690 695 700

Ile Val Leu Lys Gly Ser Gly Lys Ile Ser Asp Arg Val Ile Leu Leu
705 710 715 720

Thr Glu Tyr Asp Pro Arg Lys His Lys Tyr Asp Pro Asp Tyr Tyr Ile
725 730 735

Glu Asn Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Ala Phe Gly
740 745 750

Tyr Arg Lys Glu Asp Leu Arg Tyr Gln Ser Ser Lys Gln Thr Gly Leu
755 760 765

Asp Ala Trp Leu Lys Arg
770

<210> 84
<211> 1829
<212> PRT
<213> Thermococcus sp.

<220>
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<222> (1118)..(1118)
<223> Xaa can be any naturally occurring amino acid

<220>
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<222> (1123)..(1123)
<223> Xaa can be any naturally occurring amino acid

<400> 84

Met Ile Leu Asp Thr Asp Tyr Ile Thr Lys Asp Gly Lys Pro Ile Ile
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Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Glu Leu Asp Pro
20 25 30

His Phe Gln Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
35 40 45

Asp Glu Ile Lys Ala Ile Lys Gly Glu Arg His Gly Lys Ile Val Arg
50 55 60

Val Val Asp Ala Val Lys Val Lys Lys Lys Phe Leu Gly Arg Asp Val
65 70 75 80

Glu Val Trp Lys Leu Ile Phe Glu His Pro Gln Asp Val Pro Ala Leu
85 90 95

Arg Gly Lys Ile Arg Glu His Pro Ala Val Ile Asp Ile Tyr Glu Tyr
100 105 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
115 120 125

Met Glu Gly Asp Glu Glu Leu Lys Leu Met Ala Phe Asp Ile Glu Thr
130 135 140

Phe Tyr His Glu Gly Asp Glu Phe Gly Lys Gly Glu Ile Ile Met Ile
145 150 155 160

Ser Tyr Ala Asp Glu Glu Glu Ala Arg Val Ile Thr Trp Lys Asn Ile
165 170 175

Asp Leu Pro Tyr Val Asp Val Val Ser Asn Glu Arg Glu Met Ile Lys

180 185 190

Arg Phe Val Gln Ile Val Arg Glu Lys Asp Pro Asp Val Leu Ile Thr
195 200 205

Tyr Asn Gly Asp Asn Phe Asp Leu Pro Tyr Leu Ile Lys Arg Ala Glu
210 215 220

Lys Leu Gly Val Thr Leu Leu Leu Gly Arg Asp Lys Glu His Pro Glu
225 230 235 240

Pro Lys Ile His Arg Met Gly Asp Ser Phe Ala Val Glu Ile Lys Gly
245 250 255

Arg Ile His Phe Asp Leu Phe Pro Val Val Arg Arg Thr Ile Asn Leu
260 265 270

Pro Thr Tyr Thr Leu Glu Ala Val Tyr Glu Ala Val Leu Gly Lys Thr
275 280 285

Lys Ser Lys Leu Gly Ala Glu Glu Ile Ala Ala Ile Trp Glu Thr Glu
290 295 300

Glu Ser Met Lys Lys Leu Ala Gln Tyr Ser Met Glu Asp Ala Arg Ala
305 310 315 320

Thr Tyr Glu Leu Gly Lys Glu Phe Phe Pro Met Glu Ala Glu Leu Ala
325 330 335

Lys Leu Ile Gly Gln Ser Val Trp Asp Val Ser Arg Ser Ser Thr Gly
340 345 350

Asn Leu Val Glu Trp Tyr Leu Leu Arg Val Ala Tyr Glu Arg Asn Glu
355 360 365

Leu Ala Pro Asn Lys Pro Asp Glu Glu Glu Tyr Arg Arg Arg Leu Arg
370 375 380

Thr Thr Tyr Leu Gly Gly Tyr Val Lys Glu Pro Glu Arg Gly Leu Trp
385 390 395 400

Glu Asn Ile Ala Tyr Leu Asp Phe Arg Cys His Pro Ala Asp Thr Lys
405 410 415

Val Ile Val Lys Gly Lys Gly Ile Val Asn Ile Ser Asp Val Lys Glu
420 425 430

Gly Asp Tyr Ile Leu Gly Ile Asp Gly Trp Gln Arg Val Lys Lys Val
435 440 445

Trp Lys Tyr His Tyr Glu Gly Lys Leu Ile Asn Ile Asn Gly Leu Lys
450 455 460

Cys Thr Pro Asn His Lys Val Pro Val Val Thr Glu Asn Asp Arg Gln
465 470 475 480

Thr Arg Ile Arg Asp Ser Leu Ala Lys Ser Phe Leu Ser Gly Lys Val
485 490 495

Lys Gly Lys Ile Ile Thr Thr Lys Leu Phe Glu Lys Ile Ala Glu Phe
500 505 510

Glu Lys Asn Lys Pro Ser Glu Glu Glu Ile Leu Lys Gly Glu Leu Ser
515 520 525

Gly Ile Ile Leu Ala Glu Gly Thr Leu Leu Arg Lys Asp Ile Glu Tyr
530 535 540

Phe Asp Ser Ser Arg Gly Lys Lys Arg Ile Ser His Gln Tyr Arg Val
545 550 555 560

Glu Ile Thr Ile Gly Glu Asn Glu Lys Glu Leu Leu Glu Arg Ile Leu
565 570 575

Tyr Ile Phe Asp Lys Leu Phe Gly Ile Arg Pro Ser Val Lys Lys Lys
580 585 590

Gly Asp Thr Asn Ala Leu Lys Ile Thr Thr Ala Lys Lys Ala Val Tyr
595 600 605

Leu Gln Ile Glu Glu Leu Leu Lys Asn Ile Glu Ser Leu Tyr Ala Pro
610 615 620

Ala Val Leu Arg Gly Phe Phe Glu Arg Asp Ala Thr Val Asn Lys Ile
625 630 635 640

Arg Ser Thr Ile Val Val Thr Gln Gly Thr Asn Asn Lys Trp Lys Ile
645 650 655

Asp Ile Val Ala Lys Leu Leu Asp Ser Leu Gly Ile Pro Tyr Ser Arg
660 665 670

Tyr Glu Tyr Lys Tyr Ile Glu Asn Gly Lys Glu Leu Thr Lys His Ile
675 680 685

Leu Glu Ile Thr Gly Arg Asp Gly Leu Ile Leu Phe Gln Thr Leu Val
690 695 700

Gly Phe Ile Ser Ser Glu Lys Asn Glu Ala Leu Glu Lys Ala Ile Glu
705 710 715 720

Val Arg Glu Met Asn Arg Leu Lys Asn Asn Ser Phe Tyr Asn Leu Ser
725 730 735

Thr Phe Glu Val Ser Ser Glu Tyr Tyr Lys Gly Glu Val Tyr Asp Leu
740 745 750

Thr Leu Glu Gly Asn Pro Tyr Tyr Phe Ala Asn Gly Ile Leu Thr His
755 760 765

Asn Ser Leu Tyr Pro Ser Ile Ile Val Thr His Asn Val Ser Pro Asp
770 775 780

Thr Leu Glu Arg Glu Gly Cys Lys Asn Tyr Asp Val Ala Pro Ile Val
785 790 795 800

Gly Tyr Lys Phe Cys Lys Asp Phe Pro Gly Phe Ile Pro Ser Ile Leu
805 810 815

Gly Glu Leu Ile Thr Met Arg Gln Glu Ile Lys Lys Lys Met Lys Ala
820 825 830

Thr Ile Asp Pro Ile Glu Lys Lys Met Leu Asp Tyr Arg Gln Arg Ala
835 840 845

Val Lys Leu Leu Ala Asn Ser Ile Leu Pro Asn Glu Trp Leu Pro Ile
850 855 860

Ile Glu Asn Gly Glu Val Lys Phe Val Lys Ile Gly Glu Phe Ile Asp
865 870 875 880

Arg Tyr Met Glu Glu Gln Lys Asp Lys Val Arg Thr Val Asp Asn Thr
885 890 895

Glu Val Leu Glu Val Asp Asn Ile Phe Ala Phe Ser Leu Asn Lys Glu
900 905 910

Ser Lys Lys Ser Glu Ile Lys Lys Val Lys Ala Leu Ile Arg His Lys
915 920 925

Tyr Lys Gly Glu Ala Tyr Glu Val Glu Leu Asn Ser Gly Arg Lys Ile
930 935 940

His Ile Thr Arg Gly His Ser Leu Phe Thr Ile Arg Asn Gly Lys Ile
945 950 955 960

Lys Glu Ile Trp Gly Glu Glu Val Lys Val Gly Asp Leu Ile Ile Val
965 970 975

Pro Lys Lys Val Lys Leu Asn Glu Lys Glu Ala Val Ile Asn Ile Pro
980 985 990

Glu Leu Ile Ser Lys Leu Pro Asp Glu Asp Thr Ala Asp Val Val Met
995 1000 1005

Thr Thr Pro Val Lys Gly Arg Lys Asn Phe Phe Lys Gly Met Leu
1010 1015 1020

Arg Thr Leu Lys Trp Ile Phe Gly Glu Glu Ser Lys Arg Ile Arg
1025 1030 1035

Thr Phe Asn Arg Tyr Leu Phe His Leu Glu Glu Leu Gly Phe Val
1040 1045 1050

Lys Leu Leu Pro Arg Gly Tyr Glu Val Thr Asp Trp Glu Gly Leu
1055 1060 1065

Lys Arg Tyr Arg Gln Leu Tyr Glu Lys Leu Val Lys Asn Leu Arg
1070 1075 1080

Tyr Asn Gly Asn Lys Arg Glu Tyr Leu Val Arg Phe Asn Asp Ile
1085 1090 1095

Lys Asp Ser Val Ser Cys Phe Pro Arg Lys Glu Leu Glu Glu Trp
1100 1105 1110

Lys Ile Gly Thr Xaa Lys Gly Phe Arg Xaa Lys Cys Ile Leu Lys
1115 1120 1125

Val Asp Glu Asp Phe Gly Lys Phe Leu Gly Tyr Tyr Val Ser Glu
1130 1135 1140

Gly Tyr Ala Gly Ala Gln Lys Asn Lys Thr Gly Gly Met Ser Tyr
1145 1150 1155

Ser Val Lys Leu Tyr Asn Glu Asn Pro Asn Val Leu Lys Asp Met
1160 1165 1170

Lys Asn Ile Ala Glu Lys Phe Phe Gly Lys Val Arg Val Gly Lys

1175 1180 1185

Asn Cys Val Asp Ile Pro Lys Lys Met Ala Tyr Leu Leu Ala Lys
1190 1195 1200

Ser Leu Cys Gly Val Thr Ala Glu Asn Lys Arg Ile Pro Ser Ile
1205 1210 1215

Ile Phe Asp Ser Ser Glu Pro Val Arg Trp Ala Phe Leu Arg Ala
1220 1225 1230

Tyr Phe Val Gly Asp Gly Asp Ile His Pro Ser Lys Arg Leu Arg
1235 1240 1245

Leu Ser Thr Lys Ser Glu Leu Leu Ala Asn Gln Leu Val Phe Leu
1250 1255 1260

Leu Asn Ser Leu Gly Val Ser Ser Ile Lys Ile Gly Phe Asp Ser
1265 1270 1275

Gly Val Tyr Arg Val Tyr Ile Asn Glu Asp Leu Pro Phe Leu Gln
1280 1285 1290

Thr Ser Arg Gln Lys Asn Thr Tyr Tyr Pro Asn Leu Ile Pro Lys
1295 1300 1305

Glu Val Leu Glu Glu Ile Phe Gly Arg Lys Phe Gln Lys Asn Ile
1310 1315 1320

Thr Phe Glu Lys Phe Lys Glu Leu Ala Asp Ser Gly Lys Leu Asp
1325 1330 1335

Lys Arg Lys Val Lys Leu Leu Asp Phe Leu Leu Asn Gly Asp Ile
1340 1345 1350

Val Leu Asp Arg Val Lys Asn Val Glu Lys Arg Glu Tyr Glu Gly
1355 1360 1365

Tyr Val Tyr Asp Leu Ser Val Glu Asp Asn Glu Asn Phe Leu Val
1370 1375 1380

Gly Phe Gly Leu Leu Tyr Ala His Asn Ser Tyr Tyr Gly Tyr Met
1385 1390 1395

Gly Tyr Pro Lys Ala Arg Trp Tyr Ser Lys Glu Cys Ala Glu Ser
1400 1405 1410

Val Thr Ala Trp Gly Arg His Tyr Ile Glu Met Thr Ile Lys Glu
1415 1420 1425

Ile Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ala Asp Ser Val
1430 1435 1440

Thr Gly Asp Thr Glu Ile Ile Val Lys Arg Asn Gly Arg Ile Glu
1445 1450 1455

Phe Val Pro Ile Glu Lys Leu Phe Glu Arg Val Asp Tyr Arg Ile
1460 1465 1470

Gly Glu Lys Glu Tyr Cys Ile Leu Glu Asp Val Glu Ala Leu Thr
1475 1480 1485

Leu Asp Asn Arg Gly Lys Leu Ile Trp Lys Lys Val Pro Tyr Val
1490 1495 1500

Met Arg His Arg Ala Lys Lys Lys Val Tyr Arg Ile Trp Ile Thr
1505 1510 1515

Asn Ser Trp Tyr Ile Asp Val Thr Glu Asp His Ser Leu Ile Val
1520 1525 1530

Ala Glu Asp Gly Leu Lys Glu Ala Arg Pro Met Glu Ile Glu Gly
1535 1540 1545

Lys Ser Leu Ile Ala Thr Lys Asp Asp Leu Ser Gly Val Glu Tyr
1550 1555 1560

Ile Lys Pro His Ala Ile Glu Glu Ile Ser Tyr Asn Gly Tyr Val
1565 1570 1575

Tyr Asp Ile Glu Val Glu Gly Thr His Arg Phe Phe Ala Asn Gly
1580 1585 1590

Ile Leu Val His Asn Thr Asp Gly Phe Tyr Ala Thr Ile Pro Gly
1595 1600 1605

Glu Lys Pro Glu Thr Ile Lys Lys Lys Ala Lys Glu Phe Leu Lys
1610 1615 1620

Tyr Ile Asn Ser Lys Leu Pro Gly Leu Leu Glu Leu Glu Tyr Glu
1625 1630 1635

Gly Phe Tyr Leu Arg Gly Phe Phe Val Ala Lys Lys Arg Tyr Ala
1640 1645 1650

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Val Ile Asp Glu Glu Gly Arg Ile Thr Thr Arg Gly Leu Glu Val
1655                 1660                 1665

Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala Lys
1670                 1675                 1680

Val Leu Glu Ala Ile Leu Lys Glu Asp Ser Val Glu Lys Ala Val
1685                 1690                 1695

Glu Ile Val Lys Asp Val Val Glu Glu Ile Ala Lys Tyr Gln Val
1700                 1705                 1710

Pro Leu Glu Lys Leu Val Ile His Glu Gln Ile Thr Lys Asp Leu
1715                 1720                 1725

Ser Glu Tyr Lys Ala Ile Gly Pro His Val Ala Ile Ala Lys Arg
1730                 1735                 1740

Leu Ala Ala Lys Gly Ile Lys Val Arg Pro Gly Thr Ile Ile Ser
1745                 1750                 1755

Tyr Ile Val Leu Arg Gly Ser Gly Lys Ile Ser Asp Arg Val Ile
1760                 1765                 1770

Leu Leu Ser Glu Tyr Asp Pro Lys Lys His Lys Tyr Asp Pro Asp
1775                 1780                 1785

Tyr Tyr Ile Glu Asn Gln Val Leu Pro Ala Val Leu Arg Ile Leu
1790                 1795                 1800

Glu Ala Phe Gly Tyr Arg Lys Glu Asp Leu Lys Tyr Gln Ser Ser
1805                 1810                 1815

Lys Gln Val Gly Leu Asp Ala Trp Leu Lys Lys
1820                 1825
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<210> 85
<211> 771
<212> PRT
<213> Pyrococcus abyssi

<400> 85

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Arg Ile Phe Lys Lys Glu Lys Gly Glu Phe Lys Val Glu Tyr Asp Arg
            20                  25                  30
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Thr Phe Arg Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
35 40 45

Asp Glu Val Lys Lys Ile Thr Ala Glu Arg His Gly Lys Ile Val Arg
50 55 60

Ile Thr Glu Val Glu Lys Val Gln Lys Lys Phe Leu Gly Arg Pro Ile
65 70 75 80

Glu Val Trp Lys Leu Tyr Leu Glu His Pro Gln Asp Val Pro Ala Ile
85 90 95

Arg Glu Lys Ile Arg Glu His Pro Ala Val Val Asp Ile Phe Glu Tyr
100 105 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Thr Pro
115 120 125

Met Glu Gly Asn Glu Glu Leu Thr Phe Leu Ala Val Asp Ile Glu Thr
130 135 140

Leu Tyr His Glu Gly Glu Glu Phe Gly Lys Gly Pro Ile Ile Met Ile
145 150 155 160

Ser Tyr Ala Asp Glu Glu Gly Ala Lys Val Ile Thr Trp Lys Ser Ile
165 170 175

Asp Leu Pro Tyr Val Glu Val Val Ser Ser Glu Arg Glu Met Ile Lys
180 185 190

Arg Leu Val Lys Val Ile Arg Glu Lys Asp Pro Asp Val Ile Ile Thr
195 200 205

Tyr Asn Gly Asp Asn Phe Asp Phe Pro Tyr Leu Leu Lys Arg Ala Glu
210 215 220

Lys Leu Gly Ile Lys Leu Pro Leu Gly Arg Asp Asn Ser Glu Pro Lys
225 230 235 240

Met Gln Arg Met Gly Asp Ser Leu Ala Val Glu Ile Lys Gly Arg Ile
245 250 255

His Phe Asp Leu Phe Pro Val Ile Arg Arg Thr Ile Asn Leu Pro Thr
260 265 270

Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Lys Ser Lys Glu
275 280 285

Lys Val Tyr Ala His Glu Ile Ala Glu Ala Trp Glu Thr Gly Lys Gly
290 295 300

Leu Glu Arg Val Ala Lys Tyr Ser Met Glu Asp Ala Lys Val Thr Phe
305 310 315 320

Glu Leu Gly Lys Glu Phe Phe Pro Met Glu Ala Gln Leu Ala Arg Leu
325 330 335

Val Gly Gln Pro Val Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
340 345 350

Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Leu Ala
355 360 365

Pro Asn Lys Pro Asp Glu Arg Glu Tyr Glu Arg Arg Leu Arg Glu Ser
370 375 380

Tyr Glu Gly Gly Tyr Val Lys Glu Pro Glu Lys Gly Leu Trp Glu Gly
385 390 395 400

Ile Val Ser Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile Ile Thr
405 410 415

His Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Asn Cys Lys Glu Tyr
420 425 430

Asp Val Ala Pro Gln Val Gly His Arg Phe Cys Lys Asp Phe Pro Gly
435 440 445

Phe Ile Pro Ser Leu Leu Gly Asn Leu Leu Glu Glu Arg Gln Lys Ile
450 455 460

Lys Lys Arg Met Lys Glu Ser Lys Asp Pro Val Glu Lys Lys Leu Leu
465 470 475 480

Asp Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly
485 490 495

Tyr Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu
500 505 510

Ser Val Thr Ala Trp Gly Arg Gln Tyr Ile Asp Leu Val Arg Arg Glu
515 520 525

Leu Glu Ser Arg Gly Phe Lys Val Leu Tyr Ile Asp Thr Asp Gly Leu

530 535 540

Tyr Ala Thr Ile Pro Gly Ala Lys His Glu Glu Ile Lys Glu Lys Ala
545 550 555 560

Leu Lys Phe Val Glu Tyr Ile Asn Ser Lys Leu Pro Gly Leu Leu Glu
565 570 575

Leu Glu Tyr Glu Gly Phe Tyr Ala Arg Gly Phe Phe Val Thr Lys Lys
580 585 590

Lys Tyr Ala Leu Ile Asp Glu Glu Gly Lys Ile Val Thr Arg Gly Leu
595 600 605

Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala
610 615 620

Lys Val Leu Glu Ala Ile Leu Lys His Gly Asn Val Asp Glu Ala Val
625 630 635 640

Lys Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Ile Pro
645 650 655

Pro Glu Lys Leu Val Ile Tyr Glu Gln Ile Thr Arg Pro Leu Ser Glu
660 665 670

Tyr Lys Ala Ile Gly Pro His Val Ala Val Ala Lys Arg Leu Ala Ala
675 680 685

Lys Gly Val Lys Val Lys Pro Gly Met Val Ile Gly Tyr Ile Val Leu
690 695 700

Arg Gly Asp Gly Pro Ile Ser Lys Arg Ala Ile Ala Ile Glu Glu Phe
705 710 715 720

Asp Pro Lys Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln
725 730 735

Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys
740 745 750

Glu Asp Leu Lys Tyr Gln Lys Thr Lys Gln Val Gly Leu Gly Ala Trp
755 760 765

Leu Lys Phe
770

<210> 86
<211> 1235
<212> PRT
<213> Pyrococcus horikoshii

<400> 86

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Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Val Glu Tyr Asp Arg
20 25 30

Asn Phe Arg Pro Tyr Ile Tyr Ala Leu Leu Arg Asp Asp Ser Ala Ile
35 40 45

Asp Glu Ile Lys Lys Ile Thr Ala Gln Arg His Gly Lys Val Val Arg
50 55 60

Ile Val Glu Thr Glu Lys Ile Gln Arg Lys Phe Leu Gly Arg Pro Ile
65 70 75 80

Glu Val Trp Lys Leu Tyr Leu Glu His Pro Gln Asp Val Pro Ala Ile
85 90 95

Arg Asp Lys Ile Arg Glu His Pro Ala Val Val Asp Ile Phe Glu Tyr
100 105 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Thr Pro
115 120 125

Met Glu Gly Asn Glu Lys Leu Thr Phe Leu Ala Val Asp Ile Glu Thr
130 135 140

Leu Tyr His Glu Gly Glu Glu Phe Gly Lys Gly Pro Val Ile Met Ile
145 150 155 160

Ser Tyr Ala Asp Glu Glu Gly Ala Lys Val Ile Thr Trp Lys Lys Ile
165 170 175

Asp Leu Pro Tyr Val Glu Val Val Ser Ser Glu Arg Glu Met Ile Lys
180 185 190

Arg Leu Ile Arg Val Ile Lys Glu Lys Asp Pro Asp Val Ile Ile Thr
195 200 205

Tyr Asn Gly Asp Asn Phe Asp Phe Pro Tyr Leu Leu Lys Arg Ala Glu
210 215 220

Lys Leu Gly Ile Lys Leu Leu Leu Gly Arg Asp Asn Ser Glu Pro Lys
225 230 235 240

Met Gln Lys Met Gly Asp Ser Leu Ala Val Glu Ile Lys Gly Arg Ile
245 250 255

His Phe Asp Leu Phe Pro Val Ile Arg Arg Thr Ile Asn Leu Pro Thr
260 265 270

Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Lys Pro Lys Glu
275 280 285

Lys Val Tyr Ala Asp Glu Ile Ala Lys Ala Trp Glu Thr Gly Glu Gly
290 295 300

Leu Glu Arg Val Ala Lys Tyr Ser Met Glu Asp Ala Lys Val Thr Tyr
305 310 315 320

Glu Leu Gly Arg Glu Phe Phe Pro Met Glu Ala Gln Leu Ala Arg Leu
325 330 335

Val Gly Gln Pro Val Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
340 345 350

Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Leu Ala
355 360 365

Pro Asn Lys Pro Asp Glu Lys Glu Tyr Glu Arg Arg Leu Arg Glu Ser
370 375 380

Tyr Glu Gly Gly Tyr Val Lys Glu Pro Glu Lys Gly Leu Trp Glu Gly
385 390 395 400

Ile Val Ser Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile Ile Thr
405 410 415

His Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Gly Cys Glu Glu Tyr
420 425 430

Asp Val Ala Pro Lys Val Gly His Arg Phe Cys Lys Asp Phe Pro Gly
435 440 445

Phe Ile Pro Ser Leu Leu Gly Gln Leu Leu Glu Glu Arg Gln Lys Ile
450 455 460

Lys Lys Arg Met Lys Glu Ser Lys Asp Pro Val Glu Lys Lys Leu Leu
465 470 475 480

Asp Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Ile Leu Pro
485 490 495

Asp Glu Trp Leu Pro Ile Val Glu Asn Glu Lys Val Arg Phe Val Lys
500 505 510

Ile Gly Asp Phe Ile Asp Arg Glu Ile Glu Glu Asn Ala Glu Arg Val
515 520 525

Lys Arg Asp Gly Glu Thr Glu Ile Leu Glu Val Lys Asp Leu Lys Ala
530 535 540

Leu Ser Phe Asn Arg Glu Thr Lys Lys Ser Glu Leu Lys Lys Val Lys
545 550 555 560

Ala Leu Ile Arg His Arg Tyr Ser Gly Lys Val Tyr Ser Ile Lys Leu
565 570 575

Lys Ser Gly Arg Arg Ile Lys Ile Thr Ser Gly His Ser Leu Phe Ser
580 585 590

Val Lys Asn Gly Lys Leu Val Lys Val Arg Gly Asp Glu Leu Lys Pro
595 600 605

Gly Asp Leu Val Val Val Pro Gly Arg Leu Lys Leu Pro Glu Ser Lys
610 615 620

Gln Val Leu Asn Leu Val Glu Leu Leu Leu Lys Leu Pro Glu Glu Glu
625 630 635 640

Thr Ser Asn Ile Val Met Met Ile Pro Val Lys Gly Arg Lys Asn Phe
645 650 655

Phe Lys Gly Met Leu Lys Thr Leu Tyr Trp Ile Phe Gly Glu Gly Glu
660 665 670

Arg Pro Arg Thr Ala Gly Arg Tyr Leu Lys His Leu Glu Arg Leu Gly
675 680 685

Tyr Val Lys Leu Lys Arg Arg Gly Cys Glu Val Leu Asp Trp Glu Ser
690 695 700

Leu Lys Arg Tyr Arg Lys Leu Tyr Glu Thr Leu Ile Lys Asn Leu Lys
705 710 715 720

Tyr Asn Gly Asn Ser Arg Ala Tyr Met Val Glu Phe Asn Ser Leu Arg
725 730 735

Asp Val Val Ser Leu Met Pro Ile Glu Glu Leu Lys Glu Trp Ile Ile
740 745 750

Gly Glu Pro Arg Gly Pro Lys Ile Gly Thr Phe Ile Asp Val Asp Asp
755 760 765

Ser Phe Ala Lys Leu Leu Gly Tyr Tyr Ile Ser Ser Gly Asp Val Glu
770 775 780

Lys Asp Arg Val Lys Phe His Ser Lys Asp Gln Asn Val Leu Glu Asp
785 790 795 800

Ile Ala Lys Leu Ala Glu Lys Leu Phe Gly Lys Val Arg Arg Gly Arg
805 810 815

Gly Tyr Ile Glu Val Ser Gly Lys Ile Ser His Ala Ile Phe Arg Val
820 825 830

Leu Ala Glu Gly Lys Arg Ile Pro Glu Phe Ile Phe Thr Ser Pro Met
835 840 845

Asp Ile Lys Val Ala Phe Leu Lys Gly Leu Asn Gly Asn Ala Glu Glu
850 855 860

Leu Thr Phe Ser Thr Lys Ser Glu Leu Leu Val Asn Gln Leu Ile Leu
865 870 875 880

Leu Leu Asn Ser Ile Gly Val Ser Asp Ile Lys Ile Glu His Glu Lys
885 890 895

Gly Val Tyr Arg Val Tyr Ile Asn Lys Lys Glu Ser Ser Asn Gly Asp
900 905 910

Ile Val Leu Asp Ser Val Glu Ser Ile Glu Val Glu Lys Tyr Glu Gly
915 920 925

Tyr Val Tyr Asp Leu Ser Val Glu Asp Asn Glu Asn Phe Leu Val Gly
930 935 940

Phe Gly Leu Leu Tyr Ala His Asn Ser Tyr Tyr Gly Tyr Tyr Gly Tyr
945 950 955 960

Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu Ser Val Thr Ala
965 970 975

Trp Gly Arg Gln Tyr Ile Asp Leu Val Arg Arg Glu Leu Glu Ala Arg

980 985 990

Gly Phe Lys Val Leu Tyr Ile Asp Thr Asp Gly Leu Tyr Ala Thr Ile
995 1000 1005

Pro Gly Val Lys Asp Trp Glu Glu Val Lys Arg Arg Ala Leu Glu
1010 1015 1020

Phe Val Asp Tyr Ile Asn Ser Lys Leu Pro Gly Val Leu Glu Leu
1025 1030 1035

Glu Tyr Glu Gly Phe Tyr Ala Arg Gly Phe Phe Val Thr Lys Lys
1040 1045 1050

Lys Tyr Ala Leu Ile Asp Glu Glu Gly Lys Ile Val Thr Arg Gly
1055 1060 1065

Leu Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr
1070 1075 1080

Gln Ala Arg Val Leu Glu Ala Ile Leu Lys His Gly Asn Val Glu
1085 1090 1095

Glu Ala Val Lys Ile Val Lys Asp Val Thr Glu Lys Leu Thr Asn
1100 1105 1110

Tyr Glu Val Pro Pro Glu Lys Leu Val Ile Tyr Glu Gln Ile Thr
1115 1120 1125

Arg Pro Ile Asn Glu Tyr Lys Ala Ile Gly Pro His Val Ala Val
1130 1135 1140

Ala Lys Arg Leu Met Ala Arg Gly Ile Lys Val Lys Pro Gly Met
1145 1150 1155

Val Ile Gly Tyr Ile Val Leu Arg Gly Asp Gly Pro Ile Ser Lys
1160 1165 1170

Arg Ala Ile Ser Ile Glu Glu Phe Asp Pro Arg Lys His Lys Tyr
1175 1180 1185

Asp Ala Glu Tyr Tyr Ile Glu Asn Gln Val Leu Pro Ala Val Glu
1190 1195 1200

Arg Ile Leu Lys Ala Phe Gly Tyr Lys Arg Glu Asp Leu Arg Trp
1205 1210 1215

Gln Lys Thr Lys Gln Val Gly Leu Gly Ala Trp Ile Lys Val Lys
1220 1225 1230

Lys Ser
1235

<210> 87
<211> 771
<212> PRT
<213> Pyrococcus sp.

<400> 87

Met Ile Ile Asp Ala Asp Tyr Ile Thr Glu Asp Gly Lys Pro Ile Ile
1 5 10 15

Arg Ile Phe Lys Lys Glu Lys Gly Glu Phe Lys Val Glu Tyr Asp Arg
20 25 30

Thr Phe Arg Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
35 40 45

Asp Glu Val Lys Lys Ile Thr Ala Glu Arg His Gly Lys Ile Val Arg
50 55 60

Ile Thr Glu Val Glu Lys Val Gln Lys Lys Phe Leu Gly Arg Pro Ile
65 70 75 80

Glu Val Trp Lys Leu Tyr Leu Glu His Pro Gln Asp Val Pro Ala Ile
85 90 95

Arg Glu Lys Ile Arg Glu His Pro Ala Val Val Asp Ile Phe Glu Tyr
100 105 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Thr Pro
115 120 125

Met Glu Gly Asn Glu Glu Leu Thr Phe Leu Ala Val Asp Ile Glu Thr
130 135 140

Leu Tyr His Glu Gly Glu Glu Phe Gly Lys Gly Pro Ile Ile Met Ile
145 150 155 160

Ser Tyr Ala Asp Glu Glu Gly Ala Lys Val Ile Thr Trp Lys Ser Ile
165 170 175

Asp Leu Pro Tyr Val Glu Val Val Ser Ser Glu Arg Glu Met Ile Lys
180 185 190

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Arg Leu Val Lys Val Ile Arg Glu Lys Asp Pro Asp Val Ile Ile Thr
        195                 200                 205

Tyr Asn Gly Asp Asn Phe Asp Phe Pro Tyr Leu Leu Lys Arg Ala Glu
    210                 215                 220

Lys Leu Gly Ile Lys Leu Pro Leu Gly Arg Asp Asn Ser Glu Pro Lys
225                 230                 235                 240

Met Gln Arg Met Gly Asp Ser Leu Ala Val Glu Ile Lys Gly Arg Ile
                245                 250                 255

His Phe Asp Leu Phe Pro Val Ile Arg Arg Thr Ile Asn Leu Pro Thr
            260                 265                 270

Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Lys Ser Lys Glu
        275                 280                 285

Lys Val Tyr Ala His Glu Ile Ala Glu Ala Trp Glu Thr Gly Lys Gly
    290                 295                 300

Leu Glu Arg Val Ala Lys Tyr Ser Met Glu Asp Ala Lys Val Thr Phe
305                 310                 315                 320

Glu Leu Gly Lys Glu Phe Phe Pro Met Glu Ala Gln Leu Ala Arg Leu
                325                 330                 335

Val Gly Gln Pro Val Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
            340                 345                 350

Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Leu Ala
        355                 360                 365

Pro Asn Lys Pro Asp Glu Arg Glu Tyr Glu Arg Arg Leu Arg Glu Ser
    370                 375                 380

Tyr Glu Gly Gly Tyr Val Lys Glu Pro Glu Lys Gly Leu Trp Glu Gly
385                 390                 395                 400

Ile Val Ser Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile Ile Thr
                405                 410                 415

His Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Asn Cys Lys Glu Tyr
            420                 425                 430

Asp Val Ala Pro Gln Val Gly His Arg Phe Cys Lys Asp Phe Pro Gly
        435                 440                 445
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Phe Ile Pro Ser Leu Leu Gly Asn Leu Leu Glu Glu Arg Gln Lys Ile
450 455 460

Lys Lys Arg Met Lys Glu Ser Lys Asp Pro Val Glu Lys Lys Leu Leu
465 470 475 480

Asp Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly
485 490 495

Tyr Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu
500 505 510

Ser Val Thr Ala Trp Gly Arg Gln Tyr Ile Asp Leu Val Arg Arg Glu
515 520 525

Leu Glu Ser Ser Gly Phe Lys Val Leu Tyr Ile Asp Thr Asp Gly Leu
530 535 540

Tyr Ala Thr Ile Pro Gly Ala Lys Pro Asn Glu Ile Lys Glu Lys Ala
545 550 555 560

Leu Lys Phe Val Glu Tyr Ile Asn Ser Lys Leu Pro Gly Leu Leu Glu
565 570 575

Leu Glu Tyr Glu Gly Phe Tyr Ala Arg Gly Phe Phe Val Thr Lys Lys
580 585 590

Lys Tyr Ala Leu Ile Asp Glu Glu Gly Lys Ile Val Thr Arg Gly Leu
595 600 605

Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala
610 615 620

Lys Val Leu Glu Ala Ile Leu Lys His Gly Asn Val Asp Glu Ala Val
625 630 635 640

Lys Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Ile Pro
645 650 655

Pro Glu Lys Leu Val Ile Tyr Glu Gln Ile Thr Arg Pro Leu Ser Glu
660 665 670

Tyr Lys Ala Ile Gly Pro His Val Ala Val Ala Lys Arg Leu Ala Ala
675 680 685

Lys Gly Val Lys Val Lys Pro Gly Met Val Ile Gly Tyr Ile Val Leu
690 695 700

Arg Gly Asp Gly Pro Ile Ser Lys Arg Ala Ile Ala Ile Glu Glu Phe
705 710 715 720

Asp Pro Lys Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln
725 730 735

Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys
740 745 750

Glu Asp Leu Arg Tyr Gln Lys Thr Lys Gln Val Gly Leu Gly Ala Trp
755 760 765

Leu Lys Phe
770

<210> 88
<211> 775
<212> PRT
<213> Pyrococcus sp.

<400> 88

Met Ile Leu Asp Ala Asp Tyr Ile Thr Glu Asp Gly Lys Pro Ile Ile
1 5 10 15

Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Val Glu Tyr Asp Arg
20 25 30

Asn Phe Arg Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Gln Ile
35 40 45

Asp Glu Val Arg Lys Ile Thr Ala Glu Arg His Gly Lys Ile Val Arg
50 55 60

Ile Ile Asp Ala Glu Lys Val Arg Lys Lys Phe Leu Gly Arg Pro Ile
65 70 75 80

Glu Val Trp Arg Leu Tyr Phe Glu His Pro Gln Asp Val Pro Ala Ile
85 90 95

Arg Asp Lys Ile Arg Glu His Ser Ala Val Ile Asp Ile Phe Glu Tyr
100 105 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
115 120 125

Met Glu Gly Asp Glu Glu Leu Lys Leu Leu Ala Phe Asp Ile Glu Thr
130 135 140

Leu Tyr His Glu Gly Glu Glu Phe Ala Lys Gly Pro Ile Ile Met Ile
145 150 155 160

Ser Tyr Ala Asp Glu Glu Glu Ala Lys Val Ile Thr Trp Lys Lys Ile
165 170 175

Asp Leu Pro Tyr Val Glu Val Val Ser Ser Glu Arg Glu Met Ile Lys
180 185 190

Arg Phe Leu Lys Val Ile Arg Glu Lys Asp Pro Asp Val Ile Ile Thr
195 200 205

Tyr Asn Gly Asp Ser Phe Asp Leu Pro Tyr Leu Val Lys Arg Ala Glu
210 215 220

Lys Leu Gly Ile Lys Leu Pro Leu Gly Arg Asp Gly Ser Glu Pro Lys
225 230 235 240

Met Gln Arg Leu Gly Asp Met Thr Ala Val Glu Ile Lys Gly Arg Ile
245 250 255

His Phe Asp Leu Tyr His Val Ile Arg Arg Thr Ile Asn Leu Pro Thr
260 265 270

Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Lys Pro Lys Glu
275 280 285

Lys Val Tyr Ala His Glu Ile Ala Glu Ala Trp Glu Thr Gly Lys Gly
290 295 300

Leu Glu Arg Val Ala Lys Tyr Ser Met Glu Asp Ala Lys Val Thr Tyr
305 310 315 320

Glu Leu Gly Arg Glu Phe Phe Pro Met Glu Ala Gln Leu Ser Arg Leu
325 330 335

Val Gly Gln Pro Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
340 345 350

Val Glu Trp Tyr Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Leu Ala
355 360 365

Pro Asn Lys Pro Asp Glu Arg Glu Tyr Glu Arg Arg Leu Arg Glu Ser
370 375 380

Tyr Ala Gly Gly Tyr Val Lys Glu Pro Glu Lys Gly Leu Trp Glu Gly

385 390 395 400

Leu Val Ser Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile Ile Thr
405 410 415

His Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Gly Cys Arg Glu Tyr
420 425 430

Asp Val Ala Pro Glu Val Gly His Lys Phe Cys Lys Asp Phe Pro Gly
435 440 445

Phe Ile Pro Ser Leu Leu Lys Arg Leu Leu Asp Glu Arg Gln Glu Ile
450 455 460

Lys Arg Lys Met Lys Ala Ser Lys Asp Pro Ile Glu Lys Lys Met Leu
465 470 475 480

Asp Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly
485 490 495

Tyr Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu
500 505 510

Ser Val Thr Ala Trp Gly Arg Glu Tyr Ile Glu Phe Val Arg Lys Glu
515 520 525

Leu Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ile Asp Thr Asp Gly
530 535 540

Leu Tyr Ala Thr Ile Pro Gly Ala Lys Pro Glu Glu Ile Lys Lys Lys
545 550 555 560

Ala Leu Glu Phe Val Asp Tyr Ile Asn Ala Lys Leu Pro Gly Leu Leu
565 570 575

Glu Leu Glu Tyr Glu Gly Phe Tyr Val Arg Gly Phe Phe Val Thr Lys
580 585 590

Lys Lys Tyr Ala Leu Ile Asp Glu Glu Gly Lys Ile Ile Thr Arg Gly
595 600 605

Leu Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln
610 615 620

Ala Lys Val Leu Glu Ala Ile Leu Lys His Gly Asn Val Glu Glu Ala
625 630 635 640

Val Lys Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Ile
645 650 655

Pro Pro Glu Lys Leu Val Ile Tyr Glu Gln Ile Thr Arg Pro Leu His
660 665 670

Glu Tyr Lys Ala Ile Gly Pro His Val Ala Val Ala Lys Arg Leu Ala
675 680 685

Ala Arg Gly Val Lys Val Arg Pro Gly Met Val Ile Gly Tyr Ile Val
690 695 700

Leu Arg Gly Asp Gly Pro Ile Ser Lys Arg Ala Ile Leu Ala Glu Glu
705 710 715 720

Phe Asp Leu Arg Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn
725 730 735

Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Ala Phe Gly Tyr Arg
740 745 750

Lys Glu Asp Leu Arg Trp Gln Lys Thr Lys Gln Thr Gly Leu Thr Ala
755 760 765

Trp Leu Asn Ile Lys Lys Lys
770 775

<210> 89
<211> 775
<212> PRT
<213> Pyrococcus furiosus

<400> 89

Met Ile Leu Asp Val Asp Tyr Ile Thr Glu Glu Gly Lys Pro Val Ile
1 5 10 15

Arg Leu Phe Lys Lys Glu Asn Gly Lys Phe Lys Ile Glu His Asp Arg
20 25 30

Thr Phe Arg Pro Tyr Ile Tyr Ala Leu Leu Arg Asp Asp Ser Lys Ile
35 40 45

Glu Glu Val Lys Lys Ile Thr Gly Glu Arg His Gly Lys Ile Val Arg
50 55 60

Ile Val Asp Val Glu Lys Val Glu Lys Lys Phe Leu Gly Lys Pro Ile
65 70 75 80

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Thr Val Trp Lys Leu Tyr Leu Glu His Pro Gln Asp Val Pro Thr Ile
                85                  90                  95

Arg Glu Lys Val Arg Glu His Pro Ala Val Val Asp Ile Phe Glu Tyr
            100                 105                 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
        115                 120                 125

Met Glu Gly Glu Glu Glu Leu Lys Ile Leu Ala Phe Asp Ile Glu Thr
    130                 135                 140

Leu Tyr His Glu Gly Glu Glu Phe Gly Lys Gly Pro Ile Ile Met Ile
145                 150                 155                 160

Ser Tyr Ala Asp Glu Asn Glu Ala Lys Val Ile Thr Trp Lys Asn Ile
                165                 170                 175

Asp Leu Pro Tyr Val Glu Val Val Ser Ser Glu Arg Glu Met Ile Lys
            180                 185                 190

Arg Phe Leu Arg Ile Ile Arg Glu Lys Asp Pro Asp Ile Ile Val Thr
        195                 200                 205

Tyr Asn Gly Asp Ser Phe Asp Phe Pro Tyr Leu Ala Lys Arg Ala Glu
    210                 215                 220

Lys Leu Gly Ile Lys Leu Thr Ile Gly Arg Asp Gly Ser Glu Pro Lys
225                 230                 235                 240

Met Gln Arg Ile Gly Asp Met Thr Ala Val Glu Val Lys Gly Arg Ile
                245                 250                 255

His Phe Asp Leu Tyr His Val Ile Thr Arg Thr Ile Asn Leu Pro Thr
            260                 265                 270

Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Lys Pro Lys Glu
        275                 280                 285

Lys Val Tyr Ala Asp Glu Ile Ala Lys Ala Trp Glu Ser Gly Glu Asn
    290                 295                 300

Leu Glu Arg Val Ala Lys Tyr Ser Met Glu Asp Ala Lys Ala Thr Tyr
305                 310                 315                 320

Glu Leu Gly Lys Glu Phe Leu Pro Met Glu Ile Gln Leu Ser Arg Leu
                325                 330                 335
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Val Gly Gln Pro Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
340 345 350

Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Val Ala
355 360 365

Pro Asn Lys Pro Ser Glu Glu Glu Tyr Gln Arg Arg Leu Arg Glu Ser
370 375 380

Tyr Thr Gly Gly Phe Val Lys Glu Pro Glu Lys Gly Leu Trp Glu Asn
385 390 395 400

Ile Val Tyr Leu Asp Phe Arg Ala Leu Tyr Pro Ser Ile Ile Ile Thr
405 410 415

His Asn Val Ser Pro Asp Thr Leu Asn Leu Glu Gly Cys Lys Asn Tyr
420 425 430

Asp Ile Ala Pro Gln Val Gly His Lys Phe Cys Lys Asp Ile Pro Gly
435 440 445

Phe Ile Pro Ser Leu Leu Gly His Leu Leu Glu Glu Arg Gln Lys Ile
450 455 460

Lys Thr Lys Met Lys Glu Thr Gln Asp Pro Ile Glu Lys Ile Leu Leu
465 470 475 480

Asp Tyr Arg Gln Lys Ala Ile Lys Leu Leu Ala Asn Ser Phe Tyr Gly
485 490 495

Tyr Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu
500 505 510

Ser Val Thr Ala Trp Gly Arg Lys Tyr Ile Glu Leu Val Trp Lys Glu
515 520 525

Leu Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ile Asp Thr Asp Gly
530 535 540

Leu Tyr Ala Thr Ile Pro Gly Gly Glu Ser Glu Glu Ile Lys Lys Lys
545 550 555 560

Ala Leu Glu Phe Val Lys Tyr Ile Asn Ser Lys Leu Pro Gly Leu Leu
565 570 575

Glu Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys
580 585 590

Lys Arg Tyr Ala Val Ile Asp Glu Glu Gly Lys Val Ile Thr Arg Gly
595 600 605

Leu Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln
610 615 620

Ala Arg Val Leu Glu Thr Ile Leu Lys His Gly Asp Val Glu Glu Ala
625 630 635 640

Val Arg Ile Val Lys Glu Val Ile Gln Lys Leu Ala Asn Tyr Glu Ile
645 650 655

Pro Pro Glu Lys Leu Ala Ile Tyr Glu Gln Ile Thr Arg Pro Leu His
660 665 670

Glu Tyr Lys Ala Ile Gly Pro His Val Ala Val Ala Lys Lys Leu Ala
675 680 685

Ala Lys Gly Val Lys Ile Lys Pro Gly Met Val Ile Gly Tyr Ile Val
690 695 700

Leu Arg Gly Asp Gly Pro Ile Ser Asn Arg Ala Ile Leu Ala Glu Glu
705 710 715 720

Tyr Asp Pro Lys Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn
725 730 735

Gln Val Leu Pro Ala Val Leu Arg Ile Leu Glu Gly Phe Gly Tyr Arg
740 745 750

Lys Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Thr Ser
755 760 765

Trp Leu Asn Ile Lys Lys Ser
770 775

<210> 90
<211> 776
<212> PRT
<213> Thermococcus sp. JDF-3

<400> 90

Met Ile Leu Asp Val Asp Tyr Ile Thr Glu Asn Gly Lys Pro Val Ile
1 5 10 15

Arg Val Phe Lys Lys Glu Asn Gly Glu Phe Arg Ile Glu Tyr Asp Arg
20 25 30

Glu Phe Glu Pro Tyr Phe Tyr Ala Leu Leu Arg Asp Asp Ser Ala Ile
35 40 45

Glu Glu Ile Lys Lys Ile Thr Ala Glu Arg His Gly Arg Val Val Lys
50 55 60

Val Lys Arg Ala Glu Lys Val Lys Lys Lys Phe Leu Gly Arg Ser Val
65 70 75 80

Glu Val Trp Val Leu Tyr Phe Thr His Pro Gln Asp Val Pro Ala Ile
85 90 95

Arg Asp Lys Ile Arg Lys His Pro Ala Val Ile Asp Ile Tyr Glu Tyr
100 105 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
115 120 125

Met Glu Gly Glu Glu Glu Leu Lys Leu Met Ser Phe Asp Ile Glu Thr
130 135 140

Leu Tyr His Glu Gly Glu Glu Phe Gly Thr Gly Pro Ile Leu Met Ile
145 150 155 160

Ser Tyr Ala Asp Glu Ser Glu Ala Arg Val Ile Thr Trp Lys Lys Ile
165 170 175

Asp Leu Pro Tyr Val Glu Val Val Ser Thr Glu Lys Glu Met Ile Lys
180 185 190

Arg Phe Leu Arg Val Val Lys Glu Lys Asp Pro Asp Val Leu Ile Thr
195 200 205

Tyr Asn Gly Asp Asn Phe Asp Phe Ala Tyr Leu Lys Lys Arg Cys Glu
210 215 220

Lys Leu Gly Val Ser Phe Thr Leu Gly Arg Asp Gly Ser Glu Pro Lys
225 230 235 240

Ile Gln Arg Met Gly Asp Arg Phe Ala Val Glu Val Lys Gly Arg Val
245 250 255

His Phe Asp Leu Tyr Pro Val Ile Arg Arg Thr Ile Asn Leu Pro Thr
260 265 270

Tyr Thr Leu Glu Ala Val Tyr Glu Ala Val Phe Gly Lys Pro Lys Glu

275 280 285

Lys Val Tyr Ala Glu Glu Ile Ala Thr Ala Trp Glu Thr Gly Glu Gly
290 295 300

Leu Glu Arg Val Ala Arg Tyr Ser Met Glu Asp Ala Arg Val Thr Tyr
305 310 315 320

Glu Leu Gly Arg Glu Phe Phe Pro Met Glu Ala Gln Leu Ser Arg Leu
325 330 335

Ile Gly Gln Gly Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
340 345 350

Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Leu Ala
355 360 365

Pro Asn Lys Pro Asp Glu Arg Glu Leu Ala Arg Arg Arg Gly Gly Tyr
370 375 380

Ala Gly Gly Tyr Val Lys Glu Pro Glu Arg Gly Leu Trp Asp Asn Ile
385 390 395 400

Val Tyr Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile Ile Thr His
405 410 415

Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Gly Cys Arg Ser Tyr Asp
420 425 430

Val Ala Pro Glu Val Gly His Lys Phe Cys Lys Asp Phe Pro Gly Phe
435 440 445

Ile Pro Ser Leu Leu Gly Asn Leu Leu Glu Glu Arg Gln Lys Ile Lys
450 455 460

Arg Lys Met Lys Ala Thr Leu Asp Pro Leu Glu Lys Asn Leu Leu Asp
465 470 475 480

Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly Tyr
485 490 495

Tyr Gly Tyr Ala Arg Ala Arg Trp Tyr Cys Arg Glu Cys Ala Glu Ser
500 505 510

Val Thr Ala Trp Gly Arg Glu Tyr Ile Glu Met Val Ile Arg Glu Leu
515 520 525

Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ala Asp Thr Asp Gly Leu
530 535 540

His Ala Thr Ile Pro Gly Ala Asp Ala Glu Thr Val Lys Lys Lys Ala
545 550 555 560

Met Glu Phe Leu Asn Tyr Ile Asn Pro Lys Leu Pro Gly Leu Leu Glu
565 570 575

Leu Glu Tyr Glu Gly Phe Tyr Val Arg Gly Phe Phe Val Thr Lys Lys
580 585 590

Lys Tyr Ala Val Ile Asp Glu Glu Gly Lys Ile Thr Thr Arg Gly Leu
595 600 605

Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala
610 615 620

Arg Val Leu Glu Ala Ile Leu Arg His Gly Asp Val Glu Glu Ala Val
625 630 635 640

Arg Ile Val Arg Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Val Pro
645 650 655

Pro Glu Lys Leu Val Ile His Glu Gln Ile Thr Arg Glu Leu Lys Asp
660 665 670

Tyr Lys Ala Thr Gly Pro His Val Ala Ile Ala Lys Arg Leu Ala Ala
675 680 685

Arg Gly Val Lys Ile Arg Pro Gly Thr Val Ile Ser Tyr Ile Val Leu
690 695 700

Lys Gly Ser Gly Arg Ile Gly Asp Arg Ala Ile Pro Phe Asp Glu Phe
705 710 715 720

Asp Pro Thr Lys His Lys Tyr Asp Ala Asp Tyr Tyr Ile Glu Asn Gln
725 730 735

Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys
740 745 750

Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Gly Ala Trp
755 760 765

Leu Lys Pro Lys Gly Lys Lys Lys
770 775

<210> 91
<211> 775
<212> PRT
<213> Thermococcus sp.

<400> 91

Met Ile Leu Asp Thr Asp Tyr Ile Thr Glu Asn Gly Lys Pro Val Ile
1 5 10 15

Arg Val Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Glu Tyr Asp Arg
20 25 30

Thr Phe Glu Pro Tyr Phe Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
35 40 45

Glu Asp Val Lys Lys Val Thr Ala Lys Arg His Gly Thr Val Val Lys
50 55 60

Val Lys Arg Ala Glu Lys Val Gln Lys Lys Phe Leu Gly Arg Pro Ile
65 70 75 80

Glu Val Trp Lys Leu Tyr Phe Asn His Pro Gln Asp Val Pro Ala Ile
85 90 95

Arg Asp Arg Ile Arg Ala His Pro Ala Val Val Asp Ile Tyr Glu Tyr
100 105 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
115 120 125

Met Glu Gly Asp Glu Glu Leu Thr Met Leu Ala Phe Asp Ile Glu Thr
130 135 140

Leu Tyr His Glu Gly Glu Glu Phe Gly Thr Gly Pro Ile Leu Met Ile
145 150 155 160

Ser Tyr Ala Asp Gly Ser Glu Ala Arg Val Ile Thr Trp Lys Lys Ile
165 170 175

Asp Leu Pro Tyr Val Asp Val Val Ser Thr Glu Lys Glu Met Ile Lys
180 185 190

Arg Phe Leu Arg Val Val Arg Glu Lys Asp Pro Asp Val Leu Ile Thr
195 200 205

Tyr Asn Gly Asp Asn Phe Asp Phe Ala Tyr Leu Lys Lys Arg Cys Glu
210 215 220

Glu Leu Gly Ile Lys Phe Thr Leu Gly Arg Asp Gly Ser Glu Pro Lys
225 230 235 240

Ile Gln Arg Met Gly Asp Arg Phe Ala Val Glu Val Lys Gly Arg Ile
245 250 255

His Phe Asp Leu Tyr Pro Val Ile Arg Arg Thr Ile Asn Leu Pro Thr
260 265 270

Tyr Thr Leu Glu Ala Val Tyr Glu Ala Val Phe Gly Lys Pro Lys Glu
275 280 285

Lys Val Tyr Ala Glu Glu Ile Ala Gln Ala Trp Glu Ser Gly Glu Gly
290 295 300

Leu Glu Arg Val Ala Arg Tyr Ser Met Glu Asp Ala Lys Val Thr Tyr
305 310 315 320

Glu Leu Gly Arg Glu Phe Phe Pro Met Glu Ala Gln Leu Ser Arg Leu
325 330 335

Ile Gly Gln Ser Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
340 345 350

Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Lys Arg Asn Glu Leu Ala
355 360 365

Pro Asn Lys Pro Asp Glu Arg Glu Leu Ala Arg Arg Arg Gly Gly Tyr
370 375 380

Ala Gly Gly Tyr Val Lys Glu Pro Glu Arg Gly Leu Trp Asp Asn Ile
385 390 395 400

Val Tyr Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile Ile Thr His
405 410 415

Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Gly Cys Lys Glu Tyr Asp
420 425 430

Val Ala Pro Glu Val Gly His Lys Phe Cys Lys Asp Phe Pro Gly Phe
435 440 445

Ile Pro Ser Leu Leu Gly Asp Leu Leu Glu Glu Arg Gln Lys Ile Lys
450 455 460

Arg Lys Met Lys Ala Thr Val Asp Pro Leu Glu Lys Lys Leu Leu Asp
465 470 475 480

Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Phe Tyr Gly Tyr
485 490 495

Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu Ser
500 505 510

Val Thr Ala Trp Gly Arg Glu Tyr Ile Glu Met Val Ile Arg Glu Leu
515 520 525

Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ala Asp Thr Asp Gly Leu
530 535 540

His Ala Thr Ile Pro Gly Ala Asp Ala Glu Thr Val Lys Lys Lys Ala
545 550 555 560

Lys Glu Phe Leu Lys Tyr Ile Asn Pro Lys Leu Pro Gly Leu Leu Glu
565 570 575

Leu Glu Tyr Glu Gly Phe Tyr Val Arg Gly Phe Phe Val Thr Lys Lys
580 585 590

Lys Tyr Ala Val Ile Asp Glu Glu Gly Lys Ile Thr Thr Arg Gly Leu
595 600 605

Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala
610 615 620

Arg Val Leu Glu Ala Ile Leu Lys His Gly Asp Val Glu Glu Ala Val
625 630 635 640

Arg Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Val Pro
645 650 655

Pro Glu Lys Leu Val Ile His Glu Gln Ile Thr Arg Asp Leu Arg Asp
660 665 670

Tyr Lys Ala Thr Gly Pro His Val Ala Val Ala Lys Arg Leu Ala Ala
675 680 685

Arg Gly Val Lys Ile Arg Pro Gly Thr Val Ile Ser Tyr Ile Val Leu
690 695 700

Lys Gly Ser Gly Arg Ile Gly Asp Arg Ala Ile Pro Ala Asp Glu Phe
705 710 715 720

Asp Pro Thr Lys His Arg Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln

725 730 735

Val Leu Pro Ala Val Glu Arg Ile Leu Lys Ala Phe Gly Tyr Arg Lys
740 745 750

Glu Asp Leu Arg Tyr Gln Lys Thr Lys Gln Val Gly Leu Gly Ala Trp
755 760 765

Leu Lys Val Lys Gly Lys Lys
770 775

<210> 92
<211> 1671
<212> PRT
<213> Pyrococcus sp.

<400> 92

Met Ile Leu Asp Thr Asp Tyr Ile Thr Glu Asp Gly Lys Pro Val Ile
1 5 10 15

Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Glu Tyr Asp Arg
20 25 30

Thr Phe Glu Pro Tyr Phe Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
35 40 45

Glu Glu Val Lys Lys Ile Thr Ala Glu Arg His Gly Thr Val Val Thr
50 55 60

Val Lys Arg Val Glu Lys Val Gln Lys Lys Phe Leu Gly Arg Pro Val
65 70 75 80

Glu Val Trp Lys Leu Tyr Phe Thr His Pro Gln Asp Val Pro Ala Ile
85 90 95

Arg Asp Lys Ile Arg Glu His Pro Ala Val Ile Asp Ile Tyr Glu Tyr
100 105 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Val Pro
115 120 125

Met Glu Gly Asp Glu Glu Leu Lys Met Leu Ala Phe Asp Ile Glu Thr
130 135 140

Leu Tyr His Glu Gly Glu Glu Phe Ala Glu Gly Pro Ile Leu Met Ile
145 150 155 160

Ser Tyr Ala Asp Glu Glu Gly Ala Arg Val Ile Thr Trp Lys Asn Val

165 170 175

Asp Leu Pro Tyr Val Asp Val Val Ser Thr Glu Arg Glu Met Ile Lys
180 185 190

Arg Phe Leu Arg Val Val Lys Glu Lys Asp Pro Asp Val Leu Ile Thr
195 200 205

Tyr Asn Gly Asp Asn Phe Asp Phe Ala Tyr Leu Lys Lys Arg Cys Glu
210 215 220

Lys Leu Gly Ile Asn Phe Ala Leu Gly Arg Asp Gly Ser Glu Pro Lys
225 230 235 240

Ile Gln Arg Met Gly Asp Arg Phe Ala Val Glu Val Lys Gly Arg Ile
245 250 255

His Phe Asp Leu Tyr Pro Val Ile Arg Arg Thr Ile Asn Leu Pro Thr
260 265 270

Tyr Thr Leu Glu Ala Val Tyr Glu Ala Val Phe Gly Gln Pro Lys Glu
275 280 285

Lys Val Tyr Ala Glu Glu Ile Thr Thr Ala Trp Glu Thr Gly Glu Asn
290 295 300

Leu Glu Arg Val Ala Arg Tyr Ser Met Glu Asp Ala Lys Val Thr Tyr
305 310 315 320

Glu Leu Gly Lys Glu Phe Leu Pro Met Glu Ala Gln Leu Ser Arg Leu
325 330 335

Ile Gly Gln Ser Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
340 345 350

Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Leu Ala
355 360 365

Pro Asn Lys Pro Asp Glu Lys Glu Leu Ala Arg Arg Arg Gln Ser Tyr
370 375 380

Glu Gly Gly Tyr Val Lys Glu Pro Glu Arg Gly Leu Trp Glu Asn Ile
385 390 395 400

Val Tyr Leu Asp Phe Arg Cys His Pro Ala Asp Thr Lys Val Val Val
405 410 415

Lys Gly Lys Gly Ile Ile Asn Ile Ser Glu Val Gln Glu Gly Asp Tyr
420 425 430

Val Leu Gly Ile Asp Gly Trp Gln Arg Val Arg Lys Val Trp Glu Tyr
435 440 445

Asp Tyr Lys Gly Glu Leu Val Asn Ile Asn Gly Leu Lys Cys Thr Pro
450 455 460

Asn His Lys Leu Pro Val Val Thr Lys Asn Glu Arg Gln Thr Arg Ile
465 470 475 480

Arg Asp Ser Leu Ala Lys Ser Phe Leu Thr Lys Lys Val Lys Gly Lys
485 490 495

Ile Ile Thr Thr Pro Leu Phe Tyr Glu Ile Gly Arg Ala Thr Ser Glu
500 505 510

Asn Ile Pro Glu Glu Glu Val Leu Lys Gly Glu Leu Ala Gly Ile Leu
515 520 525

Leu Ala Glu Gly Thr Leu Leu Arg Lys Asp Val Glu Tyr Phe Asp Ser
530 535 540

Ser Arg Lys Lys Arg Arg Ile Ser His Gln Tyr Arg Val Glu Ile Thr
545 550 555 560

Ile Gly Lys Asp Glu Glu Glu Phe Arg Asp Arg Ile Thr Tyr Ile Phe
565 570 575

Glu Arg Leu Phe Gly Ile Thr Pro Ser Ile Ser Glu Lys Lys Gly Thr
580 585 590

Asn Ala Val Thr Leu Lys Val Ala Lys Lys Asn Val Tyr Leu Lys Val
595 600 605

Lys Glu Ile Met Asp Asn Ile Glu Ser Leu His Ala Pro Ser Val Leu
610 615 620

Arg Gly Phe Phe Glu Gly Asp Gly Ser Val Asn Arg Val Arg Arg Ser
625 630 635 640

Ile Val Ala Thr Gln Gly Thr Lys Asn Glu Trp Lys Ile Lys Leu Val
645 650 655

Ser Lys Leu Leu Ser Gln Leu Gly Ile Pro His Gln Thr Tyr Thr Tyr
660 665 670

Gln Tyr Gln Glu Asn Gly Lys Asp Arg Ser Arg Tyr Ile Leu Glu Ile
675 680 685

Thr Gly Lys Asp Gly Leu Ile Leu Phe Gln Thr Leu Ile Gly Phe Ile
690 695 700

Ser Glu Arg Lys Asn Ala Leu Leu Asn Lys Ala Ile Ser Gln Arg Glu
705 710 715 720

Met Asn Asn Leu Glu Asn Asn Gly Phe Tyr Arg Leu Ser Glu Phe Asn
725 730 735

Val Ser Thr Glu Tyr Tyr Glu Gly Lys Val Tyr Asp Leu Thr Leu Glu
740 745 750

Gly Thr Pro Tyr Tyr Phe Ala Asn Gly Ile Leu Thr His Asn Ser Leu
755 760 765

Tyr Pro Ser Ile Ile Ile Thr His Asn Val Ser Pro Asp Thr Leu Asn
770 775 780

Arg Glu Gly Cys Lys Glu Tyr Asp Val Ala Pro Gln Val Gly His Arg
785 790 795 800

Phe Cys Lys Asp Phe Pro Gly Phe Ile Pro Ser Leu Leu Gly Asp Leu
805 810 815

Leu Glu Glu Arg Gln Lys Ile Lys Lys Lys Met Lys Ala Thr Ile Asp
820 825 830

Pro Ile Glu Arg Lys Leu Leu Asp Tyr Arg Gln Arg Ala Ile Lys Ile
835 840 845

Leu Ala Asn Ser Ile Leu Pro Glu Glu Trp Leu Pro Val Leu Glu Glu
850 855 860

Gly Glu Val His Phe Val Arg Ile Gly Glu Leu Ile Asp Arg Met Met
865 870 875 880

Glu Glu Asn Ala Gly Lys Val Lys Arg Glu Gly Glu Thr Glu Val Leu
885 890 895

Glu Val Ser Gly Leu Glu Val Pro Ser Phe Asn Arg Arg Thr Asn Lys
900 905 910

Ala Glu Leu Lys Arg Val Lys Ala Leu Ile Arg His Asp Tyr Ser Gly
915 920 925

Lys Val Tyr Thr Ile Arg Leu Lys Ser Gly Arg Arg Ile Lys Ile Thr
930 935 940

Ser Gly His Ser Leu Phe Ser Val Arg Asn Gly Glu Leu Val Glu Val
945 950 955 960

Thr Gly Asp Glu Leu Lys Pro Gly Asp Leu Val Ala Val Pro Arg Arg
965 970 975

Leu Glu Leu Pro Glu Arg Asn His Val Leu Asn Leu Val Glu Leu Leu
980 985 990

Leu Gly Thr Pro Glu Glu Glu Thr Leu Asp Ile Val Met Thr Ile Pro
995 1000 1005

Val Lys Gly Lys Lys Asn Phe Phe Lys Gly Met Leu Arg Thr Leu
1010 1015 1020

Arg Trp Ile Phe Gly Glu Glu Lys Arg Pro Arg Thr Ala Arg Arg
1025 1030 1035

Tyr Leu Arg His Leu Glu Asp Leu Gly Tyr Val Arg Leu Lys Lys
1040 1045 1050

Ile Gly Tyr Glu Val Leu Asp Trp Asp Ser Leu Lys Asn Tyr Arg
1055 1060 1065

Arg Leu Tyr Glu Ala Leu Val Glu Asn Val Arg Tyr Asn Gly Asn
1070 1075 1080

Lys Arg Glu Tyr Leu Val Glu Phe Asn Ser Ile Arg Asp Ala Val
1085 1090 1095

Gly Ile Met Pro Leu Lys Glu Leu Lys Glu Trp Lys Ile Gly Thr
1100 1105 1110

Leu Asn Gly Phe Arg Met Arg Lys Leu Ile Glu Val Asp Glu Ser
1115 1120 1125

Leu Ala Lys Leu Leu Gly Tyr Tyr Val Ser Glu Gly Tyr Ala Arg
1130 1135 1140

Lys Gln Arg Asn Pro Lys Asn Gly Trp Ser Tyr Ser Val Lys Leu
1145 1150 1155

Tyr Asn Glu Asp Pro Glu Val Leu Asp Asp Met Glu Arg Leu Ala

1160 1165 1170

Ser Arg Phe Phe Gly Lys Val Arg Arg Gly Arg Asn Tyr Val Glu
1175 1180 1185

Ile Pro Lys Lys Ile Gly Tyr Leu Leu Phe Glu Asn Met Cys Gly
1190 1195 1200

Val Leu Ala Glu Asn Lys Arg Ile Pro Glu Phe Val Phe Thr Ser
1205 1210 1215

Pro Lys Gly Val Arg Leu Ala Phe Leu Glu Gly Tyr Phe Ile Gly
1220 1225 1230

Asp Gly Asp Val His Pro Asn Lys Arg Leu Arg Leu Ser Thr Lys
1235 1240 1245

Ser Glu Leu Leu Ala Asn Gln Leu Val Leu Leu Leu Asn Ser Val
1250 1255 1260

Gly Val Ser Ala Val Lys Leu Gly His Asp Ser Gly Val Tyr Arg
1265 1270 1275

Val Tyr Ile Asn Glu Glu Leu Pro Phe Val Lys Leu Asp Lys Lys
1280 1285 1290

Lys Asn Ala Tyr Tyr Ser His Val Ile Pro Lys Glu Val Leu Ser
1295 1300 1305

Glu Val Phe Gly Lys Val Phe Gln Lys Asn Val Ser Pro Gln Thr
1310 1315 1320

Phe Arg Lys Met Val Glu Asp Gly Arg Leu Asp Pro Glu Lys Ala
1325 1330 1335

Gln Arg Leu Ser Trp Leu Ile Glu Gly Asp Val Val Leu Asp Arg
1340 1345 1350

Val Glu Ser Val Asp Val Glu Asp Tyr Asp Gly Tyr Val Tyr Asp
1355 1360 1365

Leu Ser Val Glu Asp Asn Glu Asn Phe Leu Val Gly Phe Gly Leu
1370 1375 1380

Val Tyr Ala His Asn Ser Tyr Tyr Gly Tyr Tyr Gly Tyr Ala Arg
1385 1390 1395

Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu Ser Val Thr Ala Trp
1400 1405 1410

Gly Arg Glu Tyr Ile Thr Met Thr Ile Lys Glu Ile Glu Glu Lys
1415 1420 1425

Tyr Gly Phe Lys Val Ile Tyr Ser Asp Thr Asp Gly Phe Phe Ala
1430 1435 1440

Thr Ile Pro Gly Ala Asp Ala Glu Thr Val Lys Lys Lys Ala Met
1445 1450 1455

Glu Phe Leu Lys Tyr Ile Asn Ala Lys Leu Pro Gly Ala Leu Glu
1460 1465 1470

Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys
1475 1480 1485

Lys Lys Tyr Ala Val Ile Asp Glu Glu Gly Lys Ile Thr Thr Arg
1490 1495 1500

Gly Leu Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu
1505 1510 1515

Thr Gln Ala Arg Val Leu Glu Ala Leu Leu Lys Asp Gly Asp Val
1520 1525 1530

Glu Lys Ala Val Arg Ile Val Lys Glu Val Thr Glu Lys Leu Ser
1535 1540 1545

Lys Tyr Glu Val Pro Pro Glu Lys Leu Val Ile His Glu Gln Ile
1550 1555 1560

Thr Arg Asp Leu Lys Asp Tyr Lys Ala Thr Gly Pro His Val Ala
1565 1570 1575

Val Ala Lys Arg Leu Ala Ala Arg Gly Val Lys Ile Arg Pro Gly
1580 1585 1590

Thr Val Ile Ser Tyr Ile Val Leu Lys Gly Ser Gly Arg Ile Gly
1595 1600 1605

Asp Arg Ala Ile Pro Phe Asp Glu Phe Asp Pro Thr Lys His Lys
1610 1615 1620

Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln Val Leu Pro Ala Val
1625 1630 1635

Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys Glu Asp Leu Arg
1640 1645 1650

Tyr Gln Lys Thr Arg Gln Val Gly Leu Ser Ala Trp Leu Lys Pro
1655 1660 1665

Lys Gly Thr
1670

<210> 93
<211> 773
<212> PRT
<213> Thermococcus sp.

<400> 93

Met Ile Leu Asp Thr Asp Tyr Ile Thr Glu Asp Gly Lys Pro Val Ile
1 5 10 15

Arg Ile Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Asp Tyr Asp Arg
20 25 30

Asn Phe Glu Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
35 40 45

Glu Asp Val Lys Lys Ile Thr Ala Glu Arg His Gly Thr Thr Val Arg
50 55 60

Val Val Arg Ala Glu Lys Val Lys Lys Lys Phe Leu Gly Arg Pro Ile
65 70 75 80

Glu Val Trp Lys Leu Tyr Phe Thr His Pro Gln Asp Val Pro Ala Ile
85 90 95

Arg Asp Lys Ile Lys Glu His Pro Ala Val Val Asp Ile Tyr Glu Tyr
100 105 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
115 120 125

Met Glu Gly Asp Glu Glu Leu Lys Met Leu Ala Phe Asp Ile Glu Thr
130 135 140

Leu Tyr His Glu Gly Glu Glu Phe Ala Glu Gly Pro Ile Leu Met Ile
145 150 155 160

Ser Tyr Ala Asp Glu Glu Gly Ala Arg Val Ile Thr Trp Lys Asn Ile
165 170 175

Asp Leu Pro Tyr Val Asp Val Val Ser Thr Glu Lys Glu Met Ile Lys
180 185 190

Arg Phe Leu Lys Val Val Lys Glu Lys Asp Pro Asp Val Leu Ile Thr
195 200 205

Tyr Asn Gly Asp Asn Phe Asp Phe Ala Tyr Leu Lys Lys Arg Ser Glu
210 215 220

Lys Leu Gly Val Lys Phe Ile Leu Gly Arg Glu Gly Ser Glu Pro Lys
225 230 235 240

Ile Gln Arg Met Gly Asp Arg Phe Ala Val Glu Val Lys Gly Arg Ile
245 250 255

His Phe Asp Leu Tyr Pro Val Ile Arg Arg Thr Ile Asn Leu Pro Thr
260 265 270

Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Gln Pro Lys Glu
275 280 285

Lys Val Tyr Ala Glu Glu Ile Ala Gln Ala Trp Glu Thr Gly Glu Gly
290 295 300

Leu Glu Arg Val Ala Arg Tyr Ser Met Glu Asp Ala Lys Val Thr Tyr
305 310 315 320

Glu Leu Gly Lys Glu Phe Phe Pro Met Glu Ala Gln Leu Ser Arg Leu
325 330 335

Val Gly Gln Ser Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
340 345 350

Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Leu Ala
355 360 365

Pro Asn Lys Pro Asp Glu Arg Glu Leu Ala Arg Arg Arg Glu Ser Tyr
370 375 380

Ala Gly Gly Tyr Val Lys Glu Pro Glu Arg Gly Leu Trp Glu Asn Ile
385 390 395 400

Val Tyr Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile Ile Thr His
405 410 415

Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Gly Cys Glu Glu Tyr Asp
420 425 430

Val Ala Pro Gln Val Gly His Lys Phe Cys Lys Asp Phe Pro Gly Phe
435 440 445

Ile Pro Ser Leu Leu Gly Asp Leu Leu Glu Glu Arg Gln Lys Val Lys
450 455 460

Lys Lys Met Lys Ala Thr Ile Asp Pro Ile Glu Lys Lys Leu Leu Asp
465 470 475 480

Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Phe Tyr Gly Tyr
485 490 495

Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu Ser
500 505 510

Val Thr Ala Trp Gly Arg Gln Tyr Ile Glu Thr Thr Ile Arg Glu Ile
515 520 525

Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ala Asp Thr Asp Gly Phe
530 535 540

Phe Ala Thr Ile Pro Gly Ala Asp Ala Glu Thr Val Lys Lys Lys Ala
545 550 555 560

Lys Glu Phe Leu Asp Tyr Ile Asn Ala Lys Leu Pro Gly Leu Leu Glu
565 570 575

Leu Glu Tyr Glu Gly Phe Tyr Lys Arg Gly Phe Phe Val Thr Lys Lys
580 585 590

Lys Tyr Ala Val Ile Asp Glu Glu Asp Lys Ile Thr Thr Arg Gly Leu
595 600 605

Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala
610 615 620

Arg Val Leu Glu Ala Ile Leu Lys His Gly Asp Val Glu Glu Ala Val
625 630 635 640

Arg Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Val Pro
645 650 655

Pro Glu Lys Leu Val Ile Tyr Glu Gln Ile Thr Arg Asp Leu Lys Asp
660 665 670

Tyr Lys Ala Thr Gly Pro His Val Ala Val Ala Lys Arg Leu Ala Ala

675 680 685

Arg Gly Ile Lys Ile Arg Pro Gly Thr Val Ile Ser Tyr Ile Val Leu
690 695 700

Lys Gly Ser Gly Arg Ile Gly Asp Arg Ala Ile Pro Phe Asp Glu Phe
705 710 715 720

Asp Pro Ala Lys His Lys Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln
725 730 735

Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys
740 745 750

Glu Asp Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Gly Ala Trp
755 760 765

Leu Lys Pro Lys Thr
770

<210> 94
<211> 1523
<212> PRT
<213> Thermococcus fumicolans

<400> 94

Met Ile Leu Asp Thr Asp Tyr Ile Thr Glu Asp Gly Arg Pro Val Ile
1 5 10 15

Arg Val Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Glu Tyr Asp Arg
20 25 30

Asp Phe Glu Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
35 40 45

Glu Asp Val Lys Lys Ile Thr Ala Ser Arg His Gly Thr Thr Val Arg
50 55 60

Val Val Arg Ala Gly Lys Val Lys Lys Lys Phe Leu Gly Arg Pro Ile
65 70 75 80

Glu Val Trp Lys Leu Tyr Phe Thr His Pro Gln Asp Val Pro Ala Ile
85 90 95

Arg Asp Lys Ile Arg Glu His Pro Ala Val Val Asp Ile Tyr Glu Tyr
100 105 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro

115 120 125

Met Glu Gly Asp Glu Glu Leu Lys Met Leu Ala Phe Asp Ile Glu Thr
130 135 140

Leu Tyr His Glu Gly Glu Glu Phe Ala Glu Gly Pro Ile Leu Met Ile
145 150 155 160

Ser Tyr Ala Asp Glu Glu Gly Ala Arg Val Ile Thr Trp Lys Lys Ile
165 170 175

Asp Leu Pro Tyr Val Asp Val Val Ser Thr Glu Lys Glu Met Ile Lys
180 185 190

Arg Phe Leu Lys Val Val Lys Glu Lys Asp Pro Asp Val Leu Ile Thr
195 200 205

Tyr Asn Gly Asp Asn Phe Asp Phe Ala Tyr Leu Lys Lys Arg Ser Glu
210 215 220

Lys Leu Gly Val Lys Phe Ile Leu Gly Arg Asp Gly Ser Glu Pro Lys
225 230 235 240

Ile Gln Arg Met Gly Asp Arg Phe Ala Val Glu Val Lys Gly Arg Ile
245 250 255

His Phe Asp Leu Tyr Pro Val Ile Arg His Thr Ile Asn Leu Pro Thr
260 265 270

Tyr Thr Leu Glu Ala Val Tyr Glu Ala Ile Phe Gly Gln Pro Lys Glu
275 280 285

Lys Val Tyr Ala Glu Glu Ile Ala Gln Ala Trp Glu Thr Gly Glu Gly
290 295 300

Leu Glu Arg Val Ala Arg Tyr Ser Met Glu Asp Ala Lys Val Thr Tyr
305 310 315 320

Glu Leu Gly Arg Glu Phe Phe Pro Met Glu Ala Gln Leu Ser Arg Leu
325 330 335

Val Gly Gln Ser Phe Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
340 345 350

Val Glu Trp Tyr Leu Leu Arg Lys Ala Tyr Glu Arg Asn Glu Leu Ala
355 360 365

Pro Asn Lys Pro Ser Gly Arg Glu Leu Glu Arg Arg Arg Gly Gly Tyr
370 375 380

Ala Gly Gly Tyr Val Lys Glu Pro Glu Arg Gly Leu Trp Glu Asn Ile
385 390 395 400

Ala Tyr Leu Asp Phe Arg Cys His Pro Ala Asp Thr Lys Val Ile Val
405 410 415

Lys Gly Lys Gly Val Val Asn Ile Ser Glu Val Arg Glu Gly Asp Tyr
420 425 430

Val Leu Gly Ile Asp Gly Trp Gln Lys Val Gln Arg Val Trp Glu Tyr
435 440 445

Asp Tyr Glu Gly Glu Leu Val Asn Ile Asn Gly Leu Lys Cys Thr Pro
450 455 460

Asn His Lys Leu Pro Val Val Arg Arg Thr Glu Arg Gln Thr Ala Ile
465 470 475 480

Arg Asp Ser Leu Ala Lys Ser Phe Leu Thr Lys Lys Val Lys Gly Lys
485 490 495

Leu Ile Thr Thr Pro Leu Phe Glu Lys Ile Gly Lys Ile Glu Arg Glu
500 505 510

Asp Val Pro Glu Glu Glu Ile Leu Lys Gly Glu Leu Ala Gly Ile Ile
515 520 525

Leu Ala Glu Gly Thr Leu Leu Arg Lys Asp Val Glu Tyr Phe Asp Ser
530 535 540

Ser Arg Gly Lys Lys Arg Val Ser His Gln Tyr Arg Val Glu Ile Thr
545 550 555 560

Val Gly Ala Gln Glu Glu Asp Phe Gln Arg Arg Ile Val Tyr Ile Phe
565 570 575

Glu Arg Leu Phe Gly Val Thr Pro Ser Val Tyr Arg Lys Lys Asn Thr
580 585 590

Asn Ala Ile Thr Phe Lys Val Ala Lys Lys Glu Val Tyr Leu Arg Val
595 600 605

Arg Glu Ile Met Asp Gly Ile Glu Asn Leu His Ala Pro Ser Val Leu
610 615 620

Arg Gly Phe Phe Glu Gly Asp Gly Ser Val Asn Lys Val Arg Lys Thr
625 630 635 640

Val Val Val Asn Gln Gly Thr Asn Asn Glu Trp Lys Ile Glu Val Val
645 650 655

Ser Lys Leu Leu Asn Lys Leu Gly Ile Pro His Arg Arg Tyr Thr Tyr
660 665 670

Asp Tyr Thr Glu Arg Glu Lys Thr Met Thr Thr His Ile Leu Glu Ile
675 680 685

Ala Gly Arg Asp Gly Leu Ile Leu Phe Gln Thr Ile Val Gly Phe Ile
690 695 700

Ser Thr Glu Lys Asn Met Ala Leu Glu Glu Ala Ile Arg Asn Arg Glu
705 710 715 720

Val Asn Arg Leu Glu Asn Asn Ala Phe Tyr Thr Leu Ala Asp Phe Thr
725 730 735

Ala Lys Thr Glu Tyr Tyr Lys Gly Lys Val Tyr Asp Leu Thr Leu Glu
740 745 750

Gly Thr Pro Tyr Tyr Phe Ala Asn Gly Ile Leu Thr His Asn Ser Leu
755 760 765

Tyr Pro Ser Ile Ile Ile Ser His Asn Val Ser Pro Asp Thr Leu Asn
770 775 780

Arg Glu Gly Cys Gly Glu Tyr Asp Glu Ala Pro Gln Val Gly His Arg
785 790 795 800

Phe Cys Lys Asp Phe Pro Gly Phe Ile Pro Ser Leu Leu Gly Asp Leu
805 810 815

Leu Asp Glu Arg Gln Lys Val Lys Lys His Met Lys Ala Thr Val Asp
820 825 830

Pro Ile Glu Lys Lys Leu Leu Asp Tyr Arg Gln Arg Ala Ile Lys Ile
835 840 845

Leu Ala Asn Ser Phe Tyr Gly Tyr Tyr Gly Tyr Ala Lys Ala Arg Trp
850 855 860

Tyr Cys Lys Glu Cys Ala Glu Ser Val Thr Ala Trp Gly Arg Gln Tyr
865 870 875 880

Ile Glu Thr Thr Met Arg Glu Ile Glu Glu Lys Phe Gly Phe Lys Val
885 890 895

Leu Tyr Ala Asp Ser Val Thr Gly Asp Thr Glu Val Thr Ile Arg Arg
900 905 910

Asn Gly Arg Ile Glu Phe Val Pro Ile Glu Lys Leu Phe Glu Arg Val
915 920 925

Asp His Arg Val Gly Glu Lys Glu Tyr Cys Val Leu Gly Gly Val Glu
930 935 940

Ala Leu Thr Leu Asp Asn Arg Gly Arg Leu Val Trp Lys Lys Val Pro
945 950 955 960

Tyr Val Met Arg His Lys Thr Asp Lys Arg Ile Tyr Arg Val Trp Phe
965 970 975

Thr Asn Ser Trp Tyr Leu Asp Val Thr Glu Asp His Ser Leu Ile Gly
980 985 990

Tyr Leu Asn Thr Ser Lys Val Lys Pro Gly Lys Pro Leu Lys Glu Arg
995 1000 1005

Leu Val Glu Val Lys Pro Glu Glu Leu Gly Gly Lys Val Lys Ser
1010 1015 1020

Leu Ile Thr Pro Asn Arg Pro Ile Ala Arg Thr Ile Lys Ala Asn
1025 1030 1035

Pro Ile Ala Val Lys Leu Trp Glu Leu Ile Gly Leu Leu Val Gly
1040 1045 1050

Asp Gly Asn Trp Gly Gly Gln Ser Asn Trp Ala Lys Tyr Tyr Val
1055 1060 1065

Gly Leu Ser Cys Gly Leu Asp Lys Ala Glu Ile Glu Arg Lys Val
1070 1075 1080

Leu Asn Pro Leu Arg Glu Ala Ser Val Ile Ser Asn Tyr Tyr Asp
1085 1090 1095

Lys Ser Lys Lys Gly Asp Val Ser Ile Leu Ser Lys Trp Leu Ala
1100 1105 1110

Gly Phe Met Val Lys Tyr Phe Lys Asp Glu Asn Gly Asn Lys Ala

1115 1120 1125

Ile Pro Ser Phe Met Phe Asn Leu Pro Arg Glu Tyr Ile Glu Ala
1130 1135 1140

Phe Leu Arg Gly Leu Phe Ser Ala Asp Gly Thr Val Ser Leu Arg
1145 1150 1155

Arg Gly Ile Pro Glu Ile Arg Leu Thr Ser Val Asn Arg Glu Leu
1160 1165 1170

Ser Asp Ala Val Arg Lys Leu Leu Trp Leu Val Gly Val Ser Asn
1175 1180 1185

Ser Leu Phe Thr Glu Thr Lys Pro Asn Arg Tyr Leu Glu Lys Glu
1190 1195 1200

Ser Gly Thr His Ser Ile His Val Arg Ile Lys Asn Lys His Arg
1205 1210 1215

Phe Ala Asp Arg Ile Gly Phe Leu Ile Asp Arg Lys Ser Thr Lys
1220 1225 1230

Leu Ser Glu Asn Leu Gly Gly His Thr Asn Lys Lys Arg Ala Tyr
1235 1240 1245

Lys Tyr Asp Phe Asp Leu Val Tyr Pro Arg Lys Ile Glu Glu Ile
1250 1255 1260

Thr Tyr Asp Gly Tyr Val Tyr Asp Ile Glu Val Glu Gly Thr His
1265 1270 1275

Arg Phe Phe Ala Asn Gly Ile Leu Val His Asn Thr Asp Gly Phe
1280 1285 1290

Phe Ala Thr Ile Pro Gly Ala Asp Ala Glu Thr Val Lys Lys Lys
1295 1300 1305

Ala Arg Glu Phe Leu Asn Tyr Ile Asn Pro Lys Leu Pro Gly Leu
1310 1315 1320

Leu Glu Leu Glu Tyr Glu Gly Phe Tyr Arg Arg Gly Phe Phe Val
1325 1330 1335

Thr Lys Lys Lys Tyr Ala Val Ile Asp Glu Glu Gly Lys Ile Thr
1340 1345 1350

Thr Arg Gly Leu Glu Ile Val Arg Arg Asp Trp Ser Glu Val Ala
1355 1360 1365

Lys Glu Thr Gln Ala Arg Val Leu Glu Ala Ile Leu Arg His Gly
1370 1375 1380

Asp Val Glu Glu Ala Val Arg Ile Val Lys Glu Val Thr Glu Lys
1385 1390 1395

Leu Ser Lys Tyr Glu Val Pro Pro Glu Lys Leu Val Ile His Glu
1400 1405 1410

Gln Ile Thr Arg Glu Leu Lys Asp Tyr Lys Ala Thr Gly Pro His
1415 1420 1425

Val Ala Ile Ala Lys Arg Leu Ala Ala Arg Gly Ile Lys Val Arg
1430 1435 1440

Pro Gly Thr Val Ile Ser Tyr Ile Val Leu Lys Gly Ser Gly Arg
1445 1450 1455

Ile Gly Asp Arg Thr Ile Pro Phe Asp Glu Phe Asp Pro Thr Lys
1460 1465 1470

His Arg Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln Val Leu Pro
1475 1480 1485

Ala Val Glu Arg Ile Leu Lys Ala Phe Gly Tyr Lys Lys Glu Asp
1490 1495 1500

Leu Arg Tyr Gln Lys Thr Arg Gln Val Gly Leu Gly Ala Trp Leu
1505 1510 1515

Lys Met Gly Lys Lys
1520

<210> 95
<211> 586
<212> PRT
<213> Methanobacterium thermoautotrophicum

<400> 95

Met Glu Asp Tyr Arg Met Val Leu Leu Asp Ile Asp Tyr Val Thr Val
1 5 10 15

Asp Glu Val Pro Val Ile Arg Leu Phe Gly Lys Asp Lys Ser Gly Gly
20 25 30

Asn Glu Pro Ile Ile Ala His Asp Arg Ser Phe Arg Pro Tyr Ile Tyr
35 40 45

Ala Ile Pro Thr Asp Leu Asp Glu Cys Leu Arg Glu Leu Glu Glu Leu
50 55 60

Glu Leu Glu Lys Leu Glu Val Lys Glu Met Arg Asp Leu Gly Arg Pro
65 70 75 80

Thr Glu Val Ile Arg Ile Glu Phe Arg His Pro Gln Asp Val Pro Lys
85 90 95

Ile Arg Asp Arg Ile Arg Asp Leu Glu Ser Val Arg Asp Ile Arg Glu
100 105 110

His Asp Ile Pro Phe Tyr Arg Arg Tyr Leu Ile Asp Lys Ser Ile Val
115 120 125

Pro Met Glu Glu Leu Glu Phe Gln Gly Val Glu Val Asp Ser Ala Pro
130 135 140

Ser Val Thr Thr Asp Val Arg Thr Val Glu Val Thr Gly Arg Val Gln
145 150 155 160

Ser Thr Gly Ser Gly Ala His Gly Leu Asp Ile Leu Ser Phe Asp Ile
165 170 175

Glu Val Arg Asn Pro His Gly Met Pro Asp Pro Glu Lys Asp Glu Ile
180 185 190

Val Met Ile Gly Val Ala Gly Asn Met Gly Tyr Glu Ser Val Ile Ser
195 200 205

Thr Ala Gly Asp His Leu Asp Phe Val Glu Val Val Glu Asp Glu Arg
210 215 220

Glu Leu Leu Glu Arg Phe Ala Glu Ile Val Ile Asp Lys Lys Pro Asp
225 230 235 240

Ile Leu Val Gly Tyr Asn Ser Asp Asn Phe Asp Phe Pro Tyr Ile Thr
245 250 255

Arg Arg Ala Ala Ile Leu Gly Ala Glu Leu Asp Leu Gly Trp Asp Gly
260 265 270

Ser Lys Ile Arg Thr Met Arg Arg Gly Phe Ala Asn Ala Thr Ala Ile
275 280 285

Lys Gly Thr Val His Val Asp Leu Tyr Pro Val Met Arg Arg Tyr Met
290 295 300

Asn Leu Asp Arg Tyr Thr Leu Glu Arg Val Tyr Gln Glu Leu Phe Gly
305 310 315 320

Glu Glu Lys Ile Asp Leu Pro Gly Asp Arg Leu Trp Glu Tyr Trp Asp
325 330 335

Arg Asp Glu Leu Arg Asp Glu Leu Phe Arg Tyr Ser Leu Asp Asp Val
340 345 350

Val Ala Thr His Arg Ile Ala Glu Lys Ile Leu Pro Leu Asn Leu Glu
355 360 365

Leu Thr Arg Leu Val Gly Gln Pro Leu Phe Asp Ile Ser Arg Met Ala
370 375 380

Thr Gly Gln Gln Ala Glu Trp Phe Leu Val Arg Lys Ala Tyr Gln Tyr
385 390 395 400

Gly Glu Leu Val Pro Asn Lys Pro Ser Gln Ser Asp Phe Ser Ser Arg
405 410 415

Arg Gly Arg Arg Ala Val Gly Gly Tyr Val Lys Glu Pro Glu Lys Gly
420 425 430

Leu His Glu Asn Ile Val Gln Phe Asp Phe Arg Ser Leu Tyr Pro Ser
435 440 445

Ile Ile Ile Ser Lys Asn Ile Ser Pro Asp Thr Leu Thr Asp Asp Glu
450 455 460

Glu Ser Glu Cys Tyr Val Ala Pro Glu Tyr Gly Tyr Arg Phe Arg Lys
465 470 475 480

Ser Pro Arg Gly Phe Val Pro Ser Val Ile Gly Glu Ile Leu Ser Glu
485 490 495

Arg Val Arg Ile Lys Glu Glu Met Lys Gly Ser Asp Asp Pro Met Glu
500 505 510

Arg Lys Ile Leu Asn Val Gln Gln Glu Ala Leu Lys Arg Leu Ala Asn
515 520 525

Thr Met Tyr Gly Val Tyr Gly Tyr Ser Arg Phe Arg Trp Tyr Ser Met
530 535 540

Glu Cys Ala Glu Ala Ile Thr Ala Trp Gly Arg Asp Tyr Ile Lys Lys
545 550 555 560

Thr Ile Lys Thr Ala Glu Glu Phe Gly Phe His Thr Val Tyr Ala Asp
565 570 575

Thr Asp Gly Phe Tyr Ala Thr Tyr Arg Gly
580 585

<210> 96
<211> 1634
<212> PRT
<213> Methanococcus jannaschii

<400> 96

Met Gly Met Ser Met Gly Lys Ile Lys Ile Asp Ala Leu Ile Asp Asn
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Thr Tyr Lys Thr Ile Glu Asp Lys Ala Val Ile Tyr Leu Tyr Leu Ile
20 25 30

Asn Ser Ile Leu Lys Asp Arg Asp Phe Lys Pro Tyr Phe Tyr Val Glu
35 40 45

Leu His Lys Glu Lys Val Glu Asn Glu Asp Ile Glu Lys Ile Lys Glu
50 55 60

Phe Leu Leu Lys Asn Asp Leu Leu Lys Phe Val Glu Asn Ile Glu Val
65 70 75 80

Val Lys Lys Ile Ile Leu Arg Lys Glu Lys Glu Val Ile Lys Ile Ile
85 90 95

Ala Thr His Pro Gln Lys Val Pro Lys Leu Arg Lys Ile Lys Glu Cys
100 105 110

Glu Ile Val Lys Glu Ile Tyr Glu His Asp Ile Pro Phe Ala Lys Arg
115 120 125

Tyr Leu Ile Asp Asn Glu Ile Ile Pro Met Thr Tyr Trp Asp Phe Glu
130 135 140

Asn Lys Lys Pro Val Ser Ile Glu Ile Pro Lys Leu Lys Ser Val Ala
145 150 155 160

Phe Asp Met Glu Val Tyr Asn Arg Asp Thr Glu Pro Asn Pro Glu Arg
165 170 175

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Asp Pro Ile Leu Met Ala Ser Phe Trp Asp Glu Asn Gly Gly Lys Val
            180                 185                 190

Ile Thr Tyr Lys Glu Phe Asn His Pro Asn Ile Glu Val Val Lys Asn
        195                 200                 205

Glu Lys Glu Leu Ile Lys Lys Ile Ile Glu Thr Leu Lys Glu Tyr Asp
    210                 215                 220

Val Ile Tyr Thr Tyr Asn Gly Asp Asn Phe Asp Phe Pro Tyr Leu Lys
225                 230                 235                 240

Ala Arg Ala Lys Ile Tyr Gly Ile Asp Ile Asn Leu Gly Lys Asp Gly
                245                 250                 255

Glu Glu Leu Lys Ile Lys Arg Gly Gly Met Glu Tyr Arg Ser Tyr Ile
            260                 265                 270

Pro Gly Arg Val His Ile Asp Leu Tyr Pro Ile Ser Arg Arg Leu Leu
        275                 280                 285

Lys Leu Thr Lys Tyr Thr Leu Glu Asp Val Val Tyr Asn Leu Phe Gly
    290                 295                 300

Ile Glu Lys Leu Lys Ile Pro His Thr Lys Ile Val Asp Tyr Trp Ala
305                 310                 315                 320

Asn Asn Asp Lys Thr Leu Ile Glu Tyr Ser Leu Gln Asp Ala Lys Tyr
                325                 330                 335

Thr Tyr Lys Ile Gly Lys Tyr Phe Phe Pro Leu Glu Val Met Phe Ser
            340                 345                 350

Arg Ile Val Asn Gln Thr Pro Phe Glu Ile Thr Arg Met Ser Ser Gly
        355                 360                 365

Gln Met Val Glu Tyr Leu Leu Met Lys Arg Ala Phe Lys Glu Asn Met
    370                 375                 380

Ile Val Pro Asn Lys Pro Asp Glu Glu Glu Tyr Arg Arg Arg Val Leu
385                 390                 395                 400

Thr Thr Tyr Glu Gly Gly Tyr Val Lys Glu Pro Glu Lys Gly Met Phe
                405                 410                 415

Glu Asp Ile Ile Ser Met Asp Phe Arg Cys His Pro Lys Gly Thr Lys
```

420 425 430

Val Val Val Lys Gly Lys Gly Ile Val Asn Ile Glu Asp Val Lys Glu
435 440 445

Gly Asn Tyr Val Leu Gly Ile Asp Gly Trp Gln Lys Val Lys Lys Val
450 455 460

Trp Lys Tyr Glu Tyr Glu Gly Glu Leu Ile Asn Val Asn Gly Leu Lys
465 470 475 480

Cys Thr Pro Asn His Lys Ile Pro Leu Arg Tyr Lys Ile Lys His Lys
485 490 495

Lys Ile Asn Lys Asn Asp Tyr Leu Val Arg Asp Ile Tyr Ala Lys Ser
500 505 510

Leu Leu Thr Lys Phe Lys Gly Glu Gly Lys Leu Ile Leu Cys Lys Asp
515 520 525

Phe Glu Thr Ile Gly Asn Tyr Glu Lys Tyr Ile Asn Asp Met Asp Glu
530 535 540

Asp Phe Ile Leu Lys Ser Glu Leu Ile Gly Ile Leu Leu Ala Glu Gly
545 550 555 560

His Leu Leu Arg Arg Asp Ile Glu Tyr Phe Asp Ser Ser Arg Gly Lys
565 570 575

Lys Arg Ile Ser His Gln Tyr Arg Val Glu Ile Thr Val Asn Glu Asp
580 585 590

Glu Lys Asp Phe Ile Glu Lys Ile Lys Tyr Ile Phe Lys Lys Leu Phe
595 600 605

Asn Tyr Glu Leu Tyr Val Arg Arg Lys Lys Gly Thr Lys Ala Ile Thr
610 615 620

Leu Gly Cys Ala Lys Lys Asp Ile Tyr Leu Lys Ile Glu Glu Ile Leu
625 630 635 640

Lys Asn Lys Glu Lys Tyr Leu Pro Asn Ala Ile Leu Arg Gly Phe Phe
645 650 655

Glu Gly Asp Gly Tyr Val Asn Thr Val Arg Arg Ala Val Val Val Asn
660 665 670

Gln Gly Thr Asn Asn Tyr Asp Lys Ile Lys Phe Ile Ala Ser Leu Leu
675 680 685

Asp Arg Leu Gly Ile Lys Tyr Ser Phe Tyr Thr Tyr Ser Tyr Glu Glu
690 695 700

Arg Gly Lys Lys Leu Lys Arg Tyr Val Ile Glu Ile Phe Ser Lys Gly
705 710 715 720

Asp Leu Ile Lys Phe Ser Ile Leu Ile Ser Phe Ile Ser Arg Arg Lys
725 730 735

Asn Asn Leu Leu Asn Glu Ile Ile Arg Gln Lys Thr Leu Tyr Lys Ile
740 745 750

Gly Asp Tyr Gly Phe Tyr Asp Leu Asp Asp Val Cys Val Ser Leu Glu
755 760 765

Ser Tyr Lys Gly Glu Val Tyr Asp Leu Thr Leu Glu Gly Arg Pro Tyr
770 775 780

Tyr Phe Ala Asn Gly Ile Leu Thr His Asn Ser Leu Tyr Pro Ser Ile
785 790 795 800

Ile Ile Ser Tyr Asn Ile Ser Pro Asp Thr Leu Asp Cys Glu Cys Cys
805 810 815

Lys Asp Val Ser Glu Lys Ile Leu Gly His Trp Phe Cys Lys Lys Lys
820 825 830

Glu Gly Leu Ile Pro Lys Thr Leu Arg Asn Leu Ile Glu Arg Arg Ile
835 840 845

Asn Ile Lys Arg Arg Met Lys Lys Met Ala Glu Ile Gly Glu Ile Asn
850 855 860

Glu Glu Tyr Asn Leu Leu Asp Tyr Glu Gln Lys Ser Leu Lys Ile Leu
865 870 875 880

Ala Asn Ser Ile Leu Pro Asp Glu Tyr Leu Thr Ile Ile Glu Glu Asp
885 890 895

Gly Ile Lys Val Val Lys Ile Gly Glu Tyr Ile Asp Asp Leu Met Arg
900 905 910

Lys His Lys Asp Lys Ile Lys Phe Ser Gly Ile Ser Glu Ile Leu Glu
915 920 925

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Thr Lys Asn Leu Lys Thr Phe Ser Phe Asp Lys Ile Thr Lys Lys Cys
    930                 935                 940

Glu Ile Lys Lys Val Lys Ala Leu Ile Arg His Pro Tyr Phe Gly Lys
945                 950                 955                 960

Ala Tyr Lys Ile Lys Leu Arg Ser Gly Arg Thr Ile Lys Val Thr Arg
                965                 970                 975

Gly His Ser Leu Phe Lys Tyr Glu Asn Gly Lys Ile Val Glu Val Lys
            980                 985                 990

Gly Asp Asp Val Arg Phe Gly Asp  Leu Ile Val Val Pro  Lys Lys Leu
        995                 1000                1005

Thr Cys  Val Asp Lys Glu Val  Val Ile Asn Ile Pro  Lys Arg Leu
    1010                1015                1020

Ile Asn  Ala Asp Glu Glu Glu  Ile Lys Asp Leu Val  Ile Thr Lys
    1025                1030                1035

His Lys  Asp Lys Ala Phe Phe  Val Lys Leu Lys Lys  Thr Leu Glu
    1040                1045                1050

Asp Ile  Glu Asn Asn Lys Leu  Lys Val Ile Phe Asp  Asp Cys Ile
    1055                1060                1065

Leu Tyr  Leu Lys Glu Leu Gly  Leu Ile Asp Tyr Asn  Ile Ile Lys
    1070                1075                1080

Lys Ile  Asn Lys Val Asp Ile  Lys Ile Leu Asp Glu  Glu Lys Phe
    1085                1090                1095

Lys Ala  Tyr Lys Lys Tyr Phe  Asp Thr Val Ile Glu  His Gly Asn
    1100                1105                1110

Phe Lys  Lys Gly Arg Cys Asn  Ile Gln Tyr Ile Lys  Ile Lys Asp
    1115                1120                1125

Tyr Ile  Ala Asn Ile Pro Asp  Lys Glu Phe Glu Asp  Cys Glu Ile
    1130                1135                1140

Gly Ala  Tyr Ser Gly Lys Ile  Asn Ala Leu Leu Lys  Leu Asp Glu
    1145                1150                1155

Lys Leu  Ala Lys Phe Leu Gly  Phe Phe Val Thr Arg  Gly Arg Leu
    1160                1165                1170
```

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Lys Lys  Gln Lys Leu Lys Gly  Glu Thr Val Tyr Glu  Ile Ser Val
    1175                 1180                 1185

Tyr Lys  Ser Leu Pro Glu Tyr  Gln Lys Glu Ile Ala  Glu Thr Phe
    1190                 1195                 1200

Lys Glu  Val Phe Gly Ala Gly  Ser Met Val Lys Asp  Lys Val Thr
    1205                 1210                 1215

Met Asp  Asn Lys Ile Val Tyr  Leu Val Leu Lys Tyr  Ile Phe Lys
    1220                 1225                 1230

Cys Gly  Asp Lys Asp Lys Lys  His Ile Pro Glu Glu  Leu Phe Leu
    1235                 1240                 1245

Ala Ser  Glu Ser Val Ile Lys  Ser Phe Leu Asp Gly  Phe Leu Lys
    1250                 1255                 1260

Ala Lys  Lys Asn Ser His Lys  Gly Thr Ser Thr Phe  Met Ala Lys
    1265                 1270                 1275

Asp Glu  Lys Tyr Leu Asn Gln  Leu Met Ile Leu Phe  Asn Leu Val
    1280                 1285                 1290

Gly Ile  Pro Thr Arg Phe Thr  Pro Val Lys Asn Lys  Gly Tyr Lys
    1295                 1300                 1305

Leu Thr  Leu Asn Pro Lys Tyr  Gly Thr Val Lys Asp  Leu Met Leu
    1310                 1315                 1320

Asp Glu  Val Lys Glu Ile Glu  Ala Phe Glu Tyr Ser  Gly Tyr Val
    1325                 1330                 1335

Tyr Asp  Leu Ser Val Glu Asp  Asn Glu Asn Phe Leu  Val Asn Asn
    1340                 1345                 1350

Ile Tyr  Ala His Asn Ser Val  Tyr Gly Tyr Leu Ala  Phe Pro Arg
    1355                 1360                 1365

Ala Arg  Phe Tyr Ser Arg Glu  Cys Ala Glu Ile Val  Thr Tyr Leu
    1370                 1375                 1380

Gly Arg  Lys Tyr Ile Leu Glu  Thr Val Lys Glu Ala  Glu Lys Phe
    1385                 1390                 1395

Gly Phe  Lys Val Leu Tyr Ile  Asp Thr Asp Gly Phe  Tyr Ala Ile
```

1400 1405 1410

Trp Lys Glu Lys Ile Ser Lys Glu Glu Leu Ile Lys Lys Ala Met
1415 1420 1425

Glu Phe Val Glu Tyr Ile Asn Ser Lys Leu Pro Gly Thr Met Glu
1430 1435 1440

Leu Glu Phe Glu Gly Tyr Phe Lys Arg Gly Ile Phe Val Thr Lys
1445 1450 1455

Lys Arg Tyr Ala Leu Ile Asp Glu Asn Gly Arg Val Thr Val Lys
1460 1465 1470

Gly Leu Glu Phe Val Arg Arg Asp Trp Ser Asn Ile Ala Lys Ile
1475 1480 1485

Thr Gln Arg Arg Val Leu Glu Ala Leu Leu Val Glu Gly Ser Ile
1490 1495 1500

Glu Lys Ala Lys Lys Ile Ile Gln Asp Val Ile Lys Asp Leu Arg
1505 1510 1515

Glu Lys Lys Ile Lys Lys Glu Asp Leu Ile Ile Tyr Thr Gln Leu
1520 1525 1530

Thr Lys Asp Pro Lys Glu Tyr Lys Thr Thr Ala Pro His Val Glu
1535 1540 1545

Ile Ala Lys Lys Leu Met Arg Glu Gly Lys Arg Ile Lys Val Gly
1550 1555 1560

Asp Ile Ile Gly Tyr Ile Ile Val Lys Gly Thr Lys Ser Ile Ser
1565 1570 1575

Glu Arg Ala Lys Leu Pro Glu Glu Val Asp Ile Asp Asp Ile Asp
1580 1585 1590

Val Asn Tyr Tyr Ile Asp Asn Gln Ile Leu Pro Pro Val Leu Arg
1595 1600 1605

Ile Met Glu Ala Val Gly Val Ser Lys Asn Glu Leu Lys Lys Glu
1610 1615 1620

Gly Ala Gln Leu Thr Leu Asp Lys Phe Phe Lys
1625 1630

<210> 97
<211> 803
<212> PRT
<213> Pyrodictium occultum

<400> 97

```
Met Thr Glu Thr Ile Glu Phe Val Leu Leu Asp Ser Ser Tyr Glu Ile
1               5                  10                  15

Leu Gly Lys Glu Pro Val Val Ile Leu Trp Gly Ile Thr Leu Asp Gly
            20                  25                  30

Lys Arg Val Val Leu Leu Asp His Arg Phe Arg Pro Tyr Phe Tyr Ala
        35                  40                  45

Leu Ile Ala Arg Gly Tyr Glu Asp Met Val Glu Glu Ile Ala Ala Ser
    50                  55                  60

Ile Arg Arg Leu Ser Val Val Lys Ser Pro Ile Ile Asp Ala Lys Pro
65                  70                  75                  80

Leu Asp Lys Arg Tyr Phe Gly Arg Pro Arg Lys Ala Val Lys Ile Thr
                85                  90                  95

Thr Met Ile Pro Glu Ser Val Arg His Tyr Arg Glu Ala Val Lys Lys
            100                 105                 110

Ile Glu Gly Val Glu Asp Ser Leu Glu Ala Asp Ile Arg Phe Ala Met
        115                 120                 125

Arg Tyr Leu Ile Asp Lys Arg Leu Tyr Pro Phe Thr Val Tyr Arg Ile
    130                 135                 140

Pro Val Glu Asp Ala Gly Arg Asn Pro Gly Phe Arg Val Asp Arg Val
145                 150                 155                 160

Tyr Lys Val Ala Gly Asp Pro Glu Pro Leu Ala Asp Ile Thr Arg Ile
                165                 170                 175

Asp Leu Pro Pro Met Arg Leu Val Ala Phe Asp Ile Glu Val Tyr Ser
            180                 185                 190

Arg Arg Gly Ser Pro Asn Pro Ala Arg Asp Pro Val Ile Ile Val Ser
        195                 200                 205

Leu Arg Asp Ser Glu Gly Lys Glu Arg Leu Ile Glu Ala Glu Gly His
    210                 215                 220
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```
Asp Asp Arg Arg Val Leu Arg Glu Phe Val Glu Tyr Val Arg Ala Phe
225                 230                 235                 240

Asp Pro Asp Ile Ile Val Gly Tyr Asn Ser Asn His Phe Asp Trp Pro
                245                 250                 255

Tyr Leu Met Glu Arg Ala Arg Arg Leu Gly Ile Lys Leu Asp Val Thr
            260                 265                 270

Arg Arg Val Gly Ala Glu Pro Thr Thr Ser Val Tyr Gly His Val Ser
        275                 280                 285

Val Gln Gly Arg Leu Asn Val Asp Leu Tyr Asp Tyr Ala Glu Glu Met
    290                 295                 300

Pro Glu Ile Lys Met Lys Thr Leu Glu Glu Val Ala Glu Tyr Leu Gly
305                 310                 315                 320

Val Met Lys Lys Ser Glu Arg Val Ile Ile Glu Trp Trp Arg Ile Pro
                325                 330                 335

Glu Tyr Trp Asp Asp Glu Lys Lys Arg Gln Leu Leu Glu Arg Tyr Ala
            340                 345                 350

Leu Asp Asp Val Arg Ala Thr Tyr Gly Leu Ala Glu Lys Met Leu Pro
        355                 360                 365

Phe Ala Ile Gln Leu Ser Thr Val Thr Gly Val Pro Leu Asp Gln Val
    370                 375                 380

Gly Ala Met Gly Val Gly Phe Arg Leu Glu Trp Tyr Leu Met Arg Ala
385                 390                 395                 400

Ala Tyr Asp Met Asn Glu Leu Val Pro Asn Arg Val Glu Arg Arg Gly
                405                 410                 415

Glu Ser Tyr Lys Gly Ala Val Val Leu Lys Pro Leu Lys Gly Val His
            420                 425                 430

Glu Asn Val Val Val Leu Asp Phe Ser Ser Met Tyr Pro Ser Ile Met
        435                 440                 445

Ile Lys Tyr Asn Val Gly Pro Asp Thr Ile Val Asp Asp Pro Ser Glu
    450                 455                 460

Cys Pro Lys Tyr Gly Gly Cys Tyr Val Ala Pro Glu Val Gly His Arg
465                 470                 475                 480
```

Phe Arg Arg Ser Pro Pro Gly Phe Phe Lys Thr Val Leu Glu Asn Leu
485 490 495

Leu Lys Leu Arg Arg Gln Val Lys Glu Lys Met Lys Glu Phe Pro Pro
500 505 510

Asp Ser Pro Glu Tyr Arg Leu Tyr Asp Glu Arg Gln Lys Ala Leu Lys
515 520 525

Val Leu Ala Asn Ala Ser Tyr Gly Tyr Met Gly Trp Ser His Ala Arg
530 535 540

Trp Tyr Cys Lys Arg Cys Ala Glu Ala Val Thr Ala Trp Gly Arg Asn
545 550 555 560

Leu Ile Leu Thr Ala Ile Glu Tyr Ala Arg Lys Leu Gly Leu Lys Val
565 570 575

Ile Tyr Gly Asp Thr Asp Ser Leu Phe Val Val Tyr Asp Lys Glu Lys
580 585 590

Val Glu Lys Leu Ile Glu Phe Val Glu Lys Glu Leu Gly Phe Glu Ile
595 600 605

Lys Ile Asp Lys Ile Tyr Lys Lys Val Phe Phe Thr Glu Ala Lys Lys
610 615 620

Arg Tyr Val Gly Leu Leu Glu Asp Gly Arg Ile Asp Ile Val Gly Phe
625 630 635 640

Glu Ala Val Arg Gly Asp Trp Cys Glu Leu Ala Lys Glu Val Gln Glu
645 650 655

Lys Ala Ala Glu Ile Val Leu Asn Thr Gly Asn Val Asp Lys Ala Ile
660 665 670

Ser Tyr Ile Arg Glu Val Ile Lys Gln Leu Arg Glu Gly Lys Val Pro
675 680 685

Ile Thr Lys Leu Ile Ile Trp Lys Thr Leu Ser Lys Arg Ile Glu Glu
690 695 700

Tyr Glu His Asp Ala Pro His Val Met Ala Ala Arg Arg Met Lys Glu
705 710 715 720

Ala Gly Tyr Glu Val Ser Pro Gly Asp Lys Val Gly Tyr Val Ile Val
725 730 735

```
Lys Gly Ser Gly Ser Val Ser Ser Arg Ala Tyr Pro Tyr Phe Met Val
            740                 745                 750

Asp Pro Ser Thr Ile Asp Val Asn Tyr Tyr Ile Asp His Gln Ile Val
        755                 760                 765

Pro Ala Ala Leu Arg Ile Leu Ser Tyr Phe Gly Val Thr Glu Lys Gln
    770                 775                 780

Leu Lys Ala Ala Ala Thr Val Gln Arg Ser Leu Phe Asp Phe Phe Ala
785                 790                 795                 800

Ser Lys Lys
```

<210> 98
<211> 784
<212> PRT
<213> Aeropyrum pernix

<400> 98

```
Met Arg Gly Ser Thr Pro Val Ile Ile Leu Trp Gly Arg Gly Ala Asp
1               5                   10                  15

Gly Ser Arg Val Val Val Phe Tyr Gly Glu Phe Arg Pro Tyr Phe Tyr
            20                  25                  30

Val Leu Pro Asp Gly Ser Val Gly Leu Asp Gln Leu Ala Ala Met Ile
        35                  40                  45

Arg Arg Leu Ser Arg Pro Ser Ser Pro Ile Leu Ser Val Glu Arg Val
    50                  55                  60

Arg Arg Arg Phe Ile Gly Arg Glu Val Glu Ala Leu Lys Val Thr Thr
65                  70                  75                  80

Leu Val Pro Ala Ser Val Arg Glu Tyr Arg Glu Ala Val Arg Arg Leu
                85                  90                  95

Gly Gly Val Arg Asp Val Leu Glu Ala Asp Ile Pro Phe Ala Leu Arg
            100                 105                 110

Phe Ile Ile Asp Phe Asn Leu Tyr Pro Met Arg Trp Tyr Val Ala Glu
        115                 120                 125

Val Arg Glu Val Ala Val Pro His Gly Tyr Ser Val Asp Arg Ala Tyr
    130                 135                 140
```

Thr Leu Ser Gly Asp Ile Arg Glu Asp Glu Thr Arg Ile Gln Glu Asp
145 150 155 160

Pro Leu Lys Gly Leu Arg Val Met Ala Phe Asp Ile Glu Val Tyr Ser
165 170 175

Lys Met Arg Thr Pro Asp Pro Lys Lys Asp Pro Val Ile Met Ile Gly
180 185 190

Leu Gln Gln Ala Gly Gly Glu Ile Glu Ile Leu Glu Ala Glu Asp Arg
195 200 205

Ser Asp Lys Lys Val Ile Ala Gly Phe Val Glu Arg Val Lys Ser Ile
210 215 220

Asp Pro Asp Val Ile Val Gly Tyr Asn Gln Asn Arg Phe Asp Trp Pro
225 230 235 240

Tyr Leu Val Glu Arg Ala Arg Val Leu Gly Val Lys Leu Ala Val Gly
245 250 255

Arg Arg Ser Val Glu Pro Gln Pro Gly Leu Tyr Gly His Tyr Ser Val
260 265 270

Ser Gly Arg Leu Asn Val Asp Leu Leu Asp Phe Ala Glu Glu Leu His
275 280 285

Glu Val Lys Val Lys Thr Leu Glu Glu Val Ala Asp Tyr Leu Gly Val
290 295 300

Val Lys Ile Gly Glu Arg Val Thr Leu Glu Trp Trp Gln Ile Gly Glu
305 310 315 320

Tyr Trp Asp Asp Pro Ser Lys Arg Glu Ile Leu Arg Lys Tyr Leu Arg
325 330 335

Asp Asp Val Arg Ser Thr Met Gly Leu Ala Glu Lys Phe Leu Pro Phe
340 345 350

Gly Ala Glu Leu Ser Gln Val Ser Gly Leu Pro Leu Asp Gln Val Met
355 360 365

Ala Ala Ser Val Gly Phe Arg Leu Glu Trp Arg Leu Ile Arg Glu Ala
370 375 380

Ala Lys Leu Gly Glu Leu Val Pro Asn Arg Val Glu Arg Ser Glu Gly

385 390 395 400

Arg Tyr Ala Gly Ala Ile Val Leu Arg Pro Lys Pro Gly Val His Glu
405 410 415

Asp Ile Ala Val Leu Asp Phe Ala Ser Met Tyr Pro Asn Ile Met Val
420 425 430

Lys Tyr Asn Val Gly Pro Asp Thr Leu Val Arg Pro Gly Glu Glu Tyr
435 440 445

Gly Glu Glu Glu Val Tyr Thr Ala Pro Glu Val Gly His Lys Phe Arg
450 455 460

Lys Ser Pro Pro Gly Phe Phe Lys Lys Ile Leu Glu Arg Phe Leu Ser
465 470 475 480

Trp Arg Arg Gln Ile Arg Ser Glu Met Lys Lys His Pro Pro Asp Ser
485 490 495

Pro Glu Tyr Lys Leu Leu Asp Glu Arg Gln Lys Ala Ile Lys Leu Leu
500 505 510

Ala Asn Ala Ser Tyr Gly Tyr Met Gly Trp Pro His Ala Arg Trp Tyr
515 520 525

Cys Arg Glu Cys Ala Glu Ala Val Thr Ala Trp Gly Arg Ser Ile Ile
530 535 540

Arg Thr Ala Ile Arg Lys Ala Gly Glu Leu Gly Leu Glu Val Ile Tyr
545 550 555 560

Gly Asp Thr Asp Ser Leu Phe Val Lys Asn Asp Pro Glu Lys Val Glu
565 570 575

Arg Leu Ile Arg Phe Val Glu Glu Glu Leu Gly Phe Asp Ile Lys Val
580 585 590

Asp Lys Val Tyr Arg Arg Val Phe Phe Thr Glu Ala Lys Lys Arg Tyr
595 600 605

Val Gly Leu Thr Val Asp Gly Lys Ile Asp Val Val Gly Phe Glu Ala
610 615 620

Val Arg Gly Asp Trp Ser Glu Leu Ala Lys Glu Thr Gln Phe Lys Val
625 630 635 640

Ala Glu Ile Val Leu Lys Thr Gly Ser Val Asp Glu Ala Val Asp Tyr
645 650 655

Val Arg Asn Ile Ile Glu Lys Leu Arg Arg Gly Gln Val Asp Met Arg
660 665 670

Lys Leu Val Ile Trp Lys Thr Leu Thr Arg Pro Pro Ser Met Tyr Glu
675 680 685

Ala Arg Gln Pro His Val Thr Ala Ala Leu Leu Met Glu Arg Ala Gly
690 695 700

Ile Lys Val Glu Pro Gly Ala Lys Ile Gly Tyr Val Val Thr Lys Gly
705 710 715 720

Ser Gly Pro Leu Tyr Thr Arg Ala Lys Pro Tyr Phe Met Ala Ser Lys
725 730 735

Glu Glu Val Asp Val Glu Tyr Tyr Val Asp Lys Gln Val Val Pro Ala
740 745 750

Ala Leu Arg Ile Leu Gln Tyr Phe Gly Val Thr Glu Lys Arg Leu Lys
755 760 765

Gly Gly Gly Arg Gln Ser Thr Leu Leu Asp Phe Met Arg Arg Gly Lys
770 775 780

<210> 99
<211> 781
<212> PRT
<213> Archaeoglobus fulgidus

<400> 99

Met Glu Arg Val Glu Gly Trp Leu Ile Asp Ala Asp Tyr Glu Thr Ile
1 5 10 15

Gly Gly Lys Ala Val Val Arg Leu Trp Cys Lys Asp Asp Gln Gly Ile
20 25 30

Phe Val Ala Tyr Asp Tyr Asn Phe Asp Pro Tyr Phe Tyr Val Ile Gly
35 40 45

Val Asp Glu Asp Ile Leu Lys Asn Ala Ala Thr Ser Thr Arg Arg Glu
50 55 60

Val Ile Lys Leu Lys Ser Phe Glu Lys Ala Gln Leu Lys Thr Leu Gly
65 70 75 80

```
Arg Glu Val Glu Gly Tyr Ile Val Tyr Ala His His Pro Gln His Val
                85                  90                  95

Pro Lys Leu Arg Asp Tyr Leu Ser Gln Phe Gly Asp Val Arg Glu Ala
            100                 105                 110

Asp Ile Pro Phe Ala Tyr Arg Tyr Leu Ile Asp Lys Asp Leu Ala Cys
        115                 120                 125

Met Asp Gly Ile Ala Ile Glu Gly Glu Lys Gln Gly Gly Val Ile Arg
    130                 135                 140

Ser Tyr Lys Ile Glu Lys Val Glu Arg Ile Pro Arg Met Glu Phe Pro
145                 150                 155                 160

Glu Leu Lys Met Leu Val Phe Asp Cys Glu Met Leu Ser Ser Phe Gly
                165                 170                 175

Met Pro Glu Pro Glu Lys Asp Pro Ile Ile Val Ile Ser Val Lys Thr
            180                 185                 190

Asn Asp Asp Asp Glu Ile Ile Leu Thr Gly Asp Glu Arg Lys Ile Ile
        195                 200                 205

Ser Asp Phe Val Lys Leu Ile Lys Ser Tyr Asp Pro Asp Ile Ile Val
    210                 215                 220

Gly Tyr Asn Gln Asp Ala Phe Asp Trp Pro Tyr Leu Arg Lys Arg Ala
225                 230                 235                 240

Glu Arg Trp Asn Ile Pro Leu Asp Val Gly Arg Asp Gly Ser Asn Val
                245                 250                 255

Val Phe Arg Gly Gly Arg Pro Lys Ile Thr Gly Arg Leu Asn Val Asp
            260                 265                 270

Leu Tyr Asp Ile Ala Met Arg Ile Ser Asp Ile Lys Ile Lys Lys Leu
        275                 280                 285

Glu Asn Val Ala Glu Phe Leu Gly Thr Lys Ile Glu Ile Ala Asp Ile
    290                 295                 300

Glu Ala Lys Asp Ile Tyr Arg Tyr Trp Ser Arg Gly Glu Lys Glu Lys
305                 310                 315                 320

Val Leu Asn Tyr Ala Arg Gln Asp Ala Ile Asn Thr Tyr Leu Ile Ala
                325                 330                 335
```

```
Lys Glu Leu Leu Pro Met His Tyr Glu Leu Ser Lys Met Ile Arg Leu
            340                 345                 350

Pro Val Asp Asp Val Thr Arg Met Gly Arg Gly Lys Gln Val Asp Trp
        355                 360                 365

Leu Leu Leu Ser Glu Ala Lys Lys Ile Gly Glu Ile Ala Pro Asn Pro
    370                 375                 380

Pro Glu His Ala Glu Ser Tyr Glu Gly Ala Phe Val Leu Glu Pro Glu
385                 390                 395                 400

Arg Gly Leu His Glu Asn Val Ala Cys Leu Asp Phe Ala Ser Met Tyr
                405                 410                 415

Pro Ser Ile Met Ile Ala Phe Asn Ile Ser Pro Asp Thr Tyr Gly Cys
            420                 425                 430

Arg Asp Asp Cys Tyr Glu Ala Pro Glu Val Gly His Lys Phe Arg Lys
        435                 440                 445

Ser Pro Asp Gly Phe Phe Lys Arg Ile Leu Arg Met Leu Ile Glu Lys
    450                 455                 460

Arg Arg Glu Leu Lys Val Glu Leu Lys Asn Leu Ser Pro Glu Ser Ser
465                 470                 475                 480

Glu Tyr Lys Leu Leu Asp Ile Lys Gln Gln Thr Leu Lys Val Leu Thr
                485                 490                 495

Asn Ser Phe Tyr Gly Tyr Met Gly Trp Asn Leu Ala Arg Trp Tyr Cys
            500                 505                 510

His Pro Cys Ala Glu Ala Thr Thr Ala Trp Gly Arg His Phe Ile Arg
        515                 520                 525

Thr Ser Ala Lys Ile Ala Glu Ser Met Gly Phe Lys Val Leu Tyr Gly
    530                 535                 540

Asp Thr Asp Ser Ile Phe Val Thr Lys Ala Gly Met Thr Lys Glu Asp
545                 550                 555                 560

Val Asp Arg Leu Ile Asp Lys Leu His Glu Glu Leu Pro Ile Gln Ile
                565                 570                 575

Glu Val Asp Glu Tyr Tyr Ser Ala Ile Phe Phe Val Glu Lys Lys Arg
            580                 585                 590
```

Tyr Ala Gly Leu Thr Glu Asp Gly Arg Leu Val Val Lys Gly Leu Glu
595 600 605

Val Arg Arg Gly Asp Trp Cys Glu Leu Ala Lys Lys Val Gln Arg Glu
610 615 620

Val Ile Glu Val Ile Leu Lys Glu Lys Asn Pro Glu Lys Ala Leu Ser
625 630 635 640

Leu Val Lys Asp Val Ile Leu Arg Ile Lys Glu Gly Lys Val Ser Leu
645 650 655

Glu Glu Val Val Ile Tyr Lys Gly Leu Thr Lys Lys Pro Ser Lys Tyr
660 665 670

Glu Ser Met Gln Ala His Val Lys Ala Ala Leu Lys Ala Arg Glu Met
675 680 685

Gly Ile Ile Tyr Pro Val Ser Ser Lys Ile Gly Tyr Val Ile Val Lys
690 695 700

Gly Ser Gly Asn Ile Gly Asp Arg Ala Tyr Pro Ile Asp Leu Ile Glu
705 710 715 720

Asp Phe Asp Gly Glu Asn Leu Arg Ile Lys Thr Lys Ser Gly Ile Glu
725 730 735

Ile Lys Lys Leu Asp Lys Asp Tyr Tyr Ile Asp Asn Gln Ile Ile Pro
740 745 750

Ser Val Leu Arg Ile Leu Glu Arg Phe Gly Tyr Thr Glu Ala Ser Leu
755 760 765

Lys Gly Ser Ser Gln Met Ser Leu Asp Ser Phe Phe Ser
770 775 780

<210> 100
<211> 773
<212> PRT
<213> Desulfurococcus saccharovorans

<400> 100

Met Ile Leu Asp Ala Asp Tyr Ile Thr Glu Asp Gly Lys Pro Val Ile
1 5 10 15

Arg Val Phe Lys Lys Glu Lys Gly Glu Phe Lys Ile Asp Tyr Asp Arg
20 25 30

```
Asp Phe Glu Pro Tyr Ile Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
        35                  40                  45

Glu Asp Ile Lys Lys Ile Thr Ala Glu Arg His Gly Thr Thr Val Arg
    50                  55                  60

Val Thr Arg Ala Glu Arg Val Lys Lys Lys Phe Leu Gly Arg Pro Val
65                  70                  75                  80

Glu Val Trp Lys Leu Tyr Phe Thr His Pro Gln Asp Val Pro Ala Ile
                85                  90                  95

Arg Asp Lys Ile Arg Glu His Pro Ala Val Val Asp Ile Tyr Glu Tyr
            100                 105                 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Arg Gly Leu Ile Pro
        115                 120                 125

Met Glu Gly Asp Glu Glu Leu Arg Met Leu Ala Phe Asp Ile Glu Thr
    130                 135                 140

Leu Tyr His Glu Gly Glu Glu Phe Gly Glu Gly Pro Ile Leu Met Ile
145                 150                 155                 160

Ser Tyr Ala Asp Glu Glu Gly Ala Arg Val Ile Thr Trp Lys Asn Ile
                165                 170                 175

Asp Leu Pro Tyr Val Glu Ser Val Ser Thr Glu Lys Glu Met Ile Lys
            180                 185                 190

Arg Phe Leu Lys Val Ile Gln Glu Lys Asp Pro Asp Val Leu Ile Thr
        195                 200                 205

Tyr Asn Gly Asp Asn Phe Asp Phe Ala Tyr Leu Lys Lys Arg Ser Glu
    210                 215                 220

Met Leu Gly Val Lys Phe Ile Leu Gly Arg Asp Gly Ser Glu Pro Lys
225                 230                 235                 240

Ile Gln Arg Met Gly Asp Arg Phe Ala Val Glu Val Lys Gly Arg Ile
                245                 250                 255

His Phe Asp Leu Tyr Pro Val Ile Arg Arg Thr Ile Asn Leu Pro Thr
            260                 265                 270

Tyr Thr Leu Glu Thr Val Tyr Glu Pro Val Phe Gly Gln Pro Lys Glu
```

275 280 285

Lys Val Tyr Ala Glu Glu Ile Ala Arg Ala Trp Glu Ser Gly Glu Gly
290 295 300

Leu Glu Arg Val Ala Arg Tyr Ser Met Glu Asp Ala Lys Ala Thr Tyr
305 310 315 320

Glu Leu Gly Lys Glu Phe Phe Pro Met Glu Ala Gln Leu Ser Arg Leu
325 330 335

Val Gly Gln Ser Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
340 345 350

Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Glu Arg Asn Asp Val Ala
355 360 365

Pro Asn Lys Pro Asp Glu Arg Glu Leu Ala Arg Arg Thr Glu Ser Tyr
370 375 380

Ala Gly Gly Tyr Val Lys Glu Pro Glu Lys Gly Leu Trp Glu Asn Ile
385 390 395 400

Val Tyr Leu Asp Tyr Lys Ser Leu Tyr Pro Ser Ile Ile Ile Thr His
405 410 415

Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Gly Cys Arg Glu Tyr Asp
420 425 430

Val Ala Pro Gln Val Gly His Arg Phe Cys Lys Asp Phe Pro Gly Phe
435 440 445

Ile Pro Ser Leu Leu Gly Asp Leu Leu Glu Glu Arg Gln Lys Val Lys
450 455 460

Lys Lys Met Lys Ala Thr Val Asp Pro Ile Glu Arg Lys Leu Leu Asp
465 470 475 480

Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Tyr Tyr Gly Tyr
485 490 495

Tyr Ala Tyr Ala Asn Ala Arg Trp Tyr Cys Arg Glu Cys Ala Glu Ser
500 505 510

Val Thr Ala Trp Gly Arg Gln Tyr Ile Glu Thr Thr Met Arg Glu Ile
515 520 525

Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ala Asp Thr Asp Gly Phe
530 535 540

Phe Ala Thr Ile Pro Gly Ala Asp Ala Glu Thr Val Lys Asn Lys Ala
545 550 555 560

Lys Glu Phe Leu Asn Tyr Ile Asn Pro Arg Leu Pro Gly Leu Leu Glu
565 570 575

Leu Glu Tyr Glu Gly Phe Tyr Arg Arg Gly Phe Phe Val Thr Lys Lys
580 585 590

Lys Tyr Ala Val Ile Asp Glu Glu Asp Lys Ile Thr Thr Arg Gly Leu
595 600 605

Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala
610 615 620

Arg Val Leu Glu Ala Ile Leu Lys His Gly Asp Val Glu Glu Ala Val
625 630 635 640

Arg Ile Val Lys Glu Val Thr Glu Lys Leu Ser Arg His Glu Val Pro
645 650 655

Pro Glu Lys Leu Val Ile Tyr Glu Gln Ile Thr Arg Asp Leu Arg Ser
660 665 670

Tyr Arg Ala Thr Gly Pro His Val Ala Val Ala Lys Arg Leu Ala Ala
675 680 685

Arg Gly Ile Lys Ile Arg Pro Gly Thr Val Ile Ser Tyr Ile Val Leu
690 695 700

Lys Gly Pro Gly Arg Val Gly Asp Arg Ala Ile Pro Phe Asp Glu Phe
705 710 715 720

Asp Pro Ala Lys His Arg Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln
725 730 735

Val Leu Pro Ala Val Glu Arg Ile Leu Arg Ala Phe Gly Tyr Arg Lys
740 745 750

Glu Asp Leu Arg Tyr Gln Lys Thr Lys Gln Ala Gly Leu Gly Ala Trp
755 760 765

Leu Lys Pro Lys Thr
770

<210> 101
<211> 775
<212> PRT
<213> Thermococcus sp.

<400> 101

Met Ile Leu Asp Thr Asp Tyr Ile Thr Glu Asn Gly Lys Pro Val Ile
1 5 10 15

Arg Val Phe Lys Lys Glu Asn Gly Glu Phe Lys Ile Glu Tyr Asp Arg
20 25 30

Thr Phe Glu Pro Tyr Phe Tyr Ala Leu Leu Lys Asp Asp Ser Ala Ile
35 40 45

Glu Asp Val Lys Lys Val Thr Ala Lys Arg His Gly Thr Val Val Lys
50 55 60

Val Lys Arg Ala Glu Lys Val Gln Lys Lys Phe Leu Gly Arg Pro Ile
65 70 75 80

Glu Val Trp Lys Leu Tyr Phe Asn His Pro Gln Asp Val Pro Ala Ile
85 90 95

Arg Asp Arg Ile Arg Ala His Pro Ala Val Val Asp Ile Tyr Glu Tyr
100 105 110

Asp Ile Pro Phe Ala Lys Arg Tyr Leu Ile Asp Lys Gly Leu Ile Pro
115 120 125

Met Glu Gly Asp Glu Glu Leu Thr Met Leu Ala Phe Asp Ile Glu Thr
130 135 140

Leu Tyr His Glu Gly Glu Glu Phe Gly Thr Gly Pro Ile Leu Met Ile
145 150 155 160

Ser Tyr Ala Asp Gly Ser Glu Ala Arg Val Ile Thr Trp Lys Lys Ile
165 170 175

Asp Leu Pro Tyr Val Asp Val Val Ser Thr Glu Lys Glu Met Ile Lys
180 185 190

Arg Phe Leu Arg Val Val Arg Glu Lys Asp Pro Asp Val Leu Ile Thr
195 200 205

Tyr Asn Gly Asp Asn Phe Asp Phe Ala Tyr Leu Lys Lys Arg Cys Glu
210 215 220

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Glu Leu Gly Ile Lys Phe Thr Leu Gly Arg Asp Gly Ser Glu Pro Lys
225                 230                 235                 240

Ile Gln Arg Met Gly Asp Arg Phe Ala Val Glu Val Lys Gly Arg Ile
                245                 250                 255

His Phe Asp Leu Tyr Pro Val Ile Arg Arg Thr Ile Asn Leu Pro Thr
            260                 265                 270

Tyr Thr Leu Glu Ala Val Tyr Glu Ala Val Phe Gly Lys Pro Lys Glu
        275                 280                 285

Lys Val Tyr Ala Glu Glu Ile Ala Gln Ala Trp Glu Ser Gly Glu Gly
    290                 295                 300

Leu Glu Arg Val Ala Arg Tyr Ser Met Glu Asp Ala Lys Val Thr Tyr
305                 310                 315                 320

Glu Leu Gly Arg Glu Phe Phe Pro Met Glu Ala Gln Leu Ser Arg Leu
                325                 330                 335

Ile Gly Gln Ser Leu Trp Asp Val Ser Arg Ser Ser Thr Gly Asn Leu
            340                 345                 350

Val Glu Trp Phe Leu Leu Arg Lys Ala Tyr Lys Arg Asn Glu Leu Ala
        355                 360                 365

Pro Asn Lys Pro Asp Glu Arg Glu Leu Ala Arg Arg Arg Gly Gly Tyr
    370                 375                 380

Ala Gly Gly Tyr Val Lys Glu Pro Glu Arg Gly Leu Trp Asp Asn Ile
385                 390                 395                 400

Val Tyr Leu Asp Phe Arg Ser Leu Tyr Pro Ser Ile Ile Ile Thr His
                405                 410                 415

Asn Val Ser Pro Asp Thr Leu Asn Arg Glu Gly Cys Lys Glu Tyr Asp
            420                 425                 430

Val Ala Pro Glu Val Gly His Lys Phe Cys Lys Asp Phe Pro Gly Phe
        435                 440                 445

Ile Pro Ser Leu Leu Gly Asp Leu Leu Glu Glu Arg Gln Lys Ile Lys
    450                 455                 460

Arg Lys Met Lys Ala Thr Val Asp Pro Leu Glu Lys Lys Leu Leu Asp
465                 470                 475                 480
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Tyr Arg Gln Arg Ala Ile Lys Ile Leu Ala Asn Ser Phe Tyr Gly Tyr
485 490 495

Tyr Gly Tyr Ala Lys Ala Arg Trp Tyr Cys Lys Glu Cys Ala Glu Ser
500 505 510

Val Thr Ala Trp Gly Arg Glu Tyr Ile Glu Met Val Ile Arg Glu Leu
515 520 525

Glu Glu Lys Phe Gly Phe Lys Val Leu Tyr Ala Asp Thr Asp Gly Leu
530 535 540

His Ala Thr Ile Pro Gly Ala Asp Ala Glu Thr Val Lys Lys Lys Ala
545 550 555 560

Lys Glu Phe Leu Lys Tyr Ile Asn Pro Lys Leu Pro Gly Leu Leu Glu
565 570 575

Leu Glu Tyr Glu Gly Phe Tyr Val Arg Gly Phe Phe Val Thr Lys Lys
580 585 590

Lys Tyr Ala Val Ile Asp Glu Glu Gly Lys Ile Thr Thr Arg Gly Leu
595 600 605

Glu Ile Val Arg Arg Asp Trp Ser Glu Ile Ala Lys Glu Thr Gln Ala
610 615 620

Arg Val Leu Glu Ala Ile Leu Lys His Gly Asp Val Glu Glu Ala Val
625 630 635 640

Arg Ile Val Lys Glu Val Thr Glu Lys Leu Ser Lys Tyr Glu Val Pro
645 650 655

Pro Glu Lys Leu Val Ile His Glu Gln Ile Thr Arg Asp Leu Arg Asp
660 665 670

Tyr Lys Ala Thr Gly Pro His Val Ala Val Ala Lys Arg Leu Ala Ala
675 680 685

Arg Gly Val Lys Ile Arg Pro Gly Thr Val Ile Ser Tyr Ile Val Leu
690 695 700

Lys Gly Ser Gly Arg Ile Gly Asp Arg Ala Ile Pro Ala Asp Glu Phe
705 710 715 720

Asp Pro Thr Lys His Arg Tyr Asp Ala Glu Tyr Tyr Ile Glu Asn Gln

725 730 735

Val Leu Pro Ala Val Glu Arg Ile Leu Lys Ala Phe Gly Tyr Arg Lys
740 745 750

Glu Asp Leu Arg Tyr Gln Lys Thr Lys Gln Val Gly Leu Gly Ala Trp
755 760 765

Leu Lys Val Lys Gly Lys Lys
770 775

<210> 102
<211> 781
<212> PRT
<213> Archaeoglobus fulgidus

<400> 102

Met Glu Arg Val Glu Gly Trp Leu Ile Asp Ala Asp Tyr Glu Thr Ile
1 5 10 15

Gly Gly Lys Ala Val Val Arg Leu Trp Cys Lys Asp Asp Gln Gly Ile
20 25 30

Phe Val Ala Tyr Asp Tyr Asn Phe Asp Pro Tyr Phe Tyr Val Ile Gly
35 40 45

Val Asp Glu Asp Ile Leu Lys Asn Ala Ala Thr Ser Thr Arg Arg Glu
50 55 60

Val Ile Lys Leu Lys Ser Phe Glu Lys Ala Gln Leu Lys Thr Leu Gly
65 70 75 80

Arg Glu Val Glu Gly Tyr Ile Val Tyr Ala His His Pro Gln His Val
85 90 95

Pro Lys Leu Arg Asp Tyr Leu Ser Gln Phe Gly Asp Val Arg Glu Ala
100 105 110

Asp Ile Pro Phe Ala Tyr Arg Tyr Leu Ile Asp Lys Asp Leu Ala Cys
115 120 125

Met Asp Gly Ile Ala Ile Glu Gly Glu Lys Gln Gly Gly Val Ile Arg
130 135 140

Ser Tyr Lys Ile Glu Lys Val Glu Arg Ile Pro Arg Met Glu Phe Pro
145 150 155 160

Glu Leu Lys Met Leu Val Phe Asp Cys Glu Met Leu Ser Ser Phe Gly

165 170 175

Met Pro Glu Pro Glu Lys Asp Pro Ile Ile Val Ile Ser Val Lys Thr
180 185 190

Asn Asp Asp Asp Glu Ile Ile Leu Thr Gly Asp Glu Arg Lys Ile Ile
195 200 205

Ser Asp Phe Val Lys Leu Ile Lys Ser Tyr Asp Pro Asp Ile Ile Val
210 215 220

Gly Tyr Asn Gln Asp Ala Phe Asp Trp Pro Tyr Leu Arg Lys Arg Ala
225 230 235 240

Glu Arg Trp Asn Ile Pro Leu Asp Val Gly Arg Asp Gly Ser Asn Val
245 250 255

Val Phe Arg Gly Gly Arg Pro Lys Ile Thr Gly Arg Leu Asn Val Asp
260 265 270

Leu Tyr Asp Ile Ala Met Arg Ile Ser Asp Ile Lys Ile Lys Lys Leu
275 280 285

Glu Asn Val Ala Glu Phe Leu Gly Thr Lys Ile Glu Ile Ala Asp Ile
290 295 300

Glu Ala Lys Asp Ile Tyr Arg Tyr Trp Ser Arg Gly Glu Lys Glu Lys
305 310 315 320

Val Leu Asn Tyr Ala Arg Gln Asp Ala Ile Asn Thr Tyr Leu Ile Ala
325 330 335

Lys Glu Leu Leu Pro Met His Tyr Glu Leu Ser Lys Met Ile Arg Leu
340 345 350

Pro Val Asp Asp Val Thr Arg Met Gly Arg Gly Lys Gln Val Asp Trp
355 360 365

Leu Leu Leu Ser Glu Ala Lys Lys Ile Gly Glu Ile Ala Pro Asn Pro
370 375 380

Pro Glu His Ala Glu Ser Tyr Glu Gly Ala Phe Val Leu Glu Pro Glu
385 390 395 400

Arg Gly Leu His Glu Asn Val Ala Cys Leu Asp Phe Ala Ser Met Tyr
405 410 415

Pro Ser Ile Met Ile Ala Phe Asn Ile Ser Pro Asp Thr Tyr Gly Cys
420 425 430

Arg Asp Asp Cys Tyr Glu Ala Pro Glu Val Gly His Lys Phe Arg Lys
435 440 445

Ser Pro Asp Gly Phe Phe Lys Arg Ile Leu Arg Met Leu Ile Glu Lys
450 455 460

Arg Arg Glu Leu Lys Val Glu Leu Lys Asn Leu Ser Pro Glu Ser Ser
465 470 475 480

Glu Tyr Lys Leu Leu Asp Ile Lys Gln Gln Thr Leu Lys Val Leu Thr
485 490 495

Asn Ser Phe Tyr Gly Tyr Met Gly Trp Asn Leu Ala Arg Trp Tyr Cys
500 505 510

His Pro Cys Ala Glu Ala Thr Thr Ala Trp Gly Arg His Phe Ile Arg
515 520 525

Thr Ser Ala Lys Ile Ala Glu Ser Met Gly Phe Lys Val Leu Tyr Gly
530 535 540

Asp Thr Asp Ser Ile Phe Val Thr Lys Ala Gly Met Thr Lys Glu Asp
545 550 555 560

Val Asp Arg Leu Ile Asp Lys Leu His Glu Glu Leu Pro Ile Gln Ile
565 570 575

Glu Val Asp Glu Tyr Tyr Ser Ala Ile Phe Phe Val Glu Lys Lys Arg
580 585 590

Tyr Ala Gly Leu Thr Glu Asp Gly Arg Leu Val Val Lys Gly Leu Glu
595 600 605

Val Arg Arg Gly Asp Trp Cys Glu Leu Ala Lys Lys Val Gln Arg Glu
610 615 620

Val Ile Glu Val Ile Leu Lys Glu Lys Asn Pro Glu Lys Ala Leu Ser
625 630 635 640

Leu Val Lys Asp Val Ile Leu Arg Ile Lys Glu Gly Lys Val Ser Leu
645 650 655

Glu Glu Val Val Ile Tyr Lys Gly Leu Thr Lys Lys Pro Ser Lys Tyr
660 665 670

Glu Ser Met Gln Ala His Val Lys Ala Ala Leu Lys Ala Arg Glu Met
675 680 685

Gly Ile Ile Tyr Pro Val Ser Ser Lys Ile Gly Tyr Val Ile Val Lys
690 695 700

Gly Ser Gly Asn Ile Gly Asp Arg Ala Tyr Pro Ile Asp Leu Ile Glu
705 710 715 720

Asp Phe Asp Gly Glu Asn Leu Arg Ile Lys Thr Lys Ser Gly Ile Glu
725 730 735

Ile Lys Lys Leu Asp Lys Asp Tyr Tyr Ile Asp Asn Gln Ile Ile Pro
740 745 750

Ser Val Leu Arg Ile Leu Glu Arg Phe Gly Tyr Thr Glu Ala Ser Leu
755 760 765

Lys Gly Ser Ser Gln Met Ser Leu Asp Ser Phe Phe Ser
770 775 780

<210> 103
<211> 824
<212> PRT
<213> Methanococcus voltae

<400> 103

Met Asp Leu Asp Tyr Asn Ser Lys Asp Leu Cys Ile Asp Met Tyr Tyr
1 5 10 15

Lys Asn Cys Gly Leu Lys Lys Pro Glu Ile Asn Leu Gln Lys Glu Cys
20 25 30

Glu Phe Lys Pro Tyr Phe Tyr Val Asp Thr Ser Glu Pro Lys Glu Ile
35 40 45

Tyr Asp Tyr Leu Asp Gly Leu Asn Gln Glu Ile Asp Leu Lys Lys Leu
50 55 60

Glu Pro Glu Phe Glu Asn Asn Thr Ser Leu Lys Val Gln Asp Leu Ile
65 70 75 80

Thr Asn Ile Glu Ile Ile Glu Lys Ile Val Tyr Ser Asp Tyr Ile Leu
85 90 95

Asn Gly Lys Asp Ile Ser Glu Val Ser Asp Phe Lys Asn Lys Lys Glu
100 105 110

Arg Lys Ile Cys Lys Val Tyr Val Lys Tyr Pro Asn His Val Lys Ile
115 120 125

Ile Arg Glu Tyr Phe Lys Glu Phe Gly Lys Ser Tyr Glu Phe Asp Ile
130 135 140

Pro Phe Leu Arg Arg Tyr Met Ile Asp Gln Asp Ile Val Pro Ser Ala
145 150 155 160

Lys Tyr Ser Glu Asp Asn Lys Ile Asp Asn Ser Ile Pro Glu Leu Asn
165 170 175

Cys Ile Ala Phe Asp Met Glu Leu Tyr Cys Lys Lys Glu Pro Asn Ala
180 185 190

Lys Lys Asp Pro Ile Ile Met Val Asn Leu Phe Ser Lys Asp Tyr Gln
195 200 205

Lys Val Ile Thr Tyr Lys Lys Phe Glu Asn Ser Glu Tyr Asn Gly Cys
210 215 220

Val Asp Tyr Val Lys Asp Glu Lys Glu Leu Ile Gln Lys Thr Ile Glu
225 230 235 240

Ile Leu Lys Gln Tyr Asp Val Ile Tyr Thr Tyr Asn Gly Asp Asn Phe
245 250 255

Asp Phe Pro Tyr Leu Lys Lys Arg Ala Asn Ile Tyr Glu Ile Glu Leu
260 265 270

Asp Phe Asp Asn Ala Ser Asn Ser Gln Gln Pro Gln Ile Ile Lys Ile
275 280 285

Ser Lys Gly Gly Ile Asn Arg Lys Ser Lys Ile Pro Gly Ile Ile His
290 295 300

Ile Asp Leu Tyr Pro Ile Ala Arg Lys Leu Leu Asn Leu Thr Lys Tyr
305 310 315 320

Lys Leu Glu Asn Val Val Gln Glu Leu Phe Lys Ile Asn Lys Glu Ala
325 330 335

Val Asp Tyr Gly Asp Ile Pro Lys Met Trp Glu Thr Glu Asp Thr Thr
340 345 350

Leu Leu Arg Tyr Ala Tyr Glu Asp Ala Leu Tyr Thr Tyr Lys Met Gly
355 360 365

Asn Tyr Phe Leu Pro Leu Glu Ile Met Phe Ser Arg Ile Val Asn Gln
370 375 380

Pro Leu Tyr Asp Thr Ser Arg Met Asn Ser Ser Gln Met Val Glu Phe
385 390 395 400

Leu Leu Leu Lys Arg Ser Phe Glu Gln Asn Met Ile Ser Pro Asn Arg
405 410 415

Pro Ser Ser Ser Ser Tyr Arg Glu Arg Ala Lys Phe Ser Tyr Glu Gly
420 425 430

Gly Tyr Val Arg Glu Pro Leu Lys Gly Ile Gln Glu Asp Ile Val Ser
435 440 445

Leu Asp Phe Met Ser Leu Tyr Pro Ser Ile Leu Ile Ser His Asn Ile
450 455 460

Ser Pro Glu Thr Val Ile Tyr Glu Glu Lys Glu Arg Glu Asn Met Glu
465 470 475 480

Leu Gly Ile Ile Pro Lys Thr Leu Asn Glu Leu Leu Ser Arg Arg Lys
485 490 495

His Ile Lys Met Leu Leu Lys Asp Lys Ile Gln Lys Asn Glu Phe Asp
500 505 510

Glu Glu Tyr Ser Arg Leu Glu His Glu Gln Lys Ser Ile Lys Val Leu
515 520 525

Ala Asn Ser His Tyr Gly Tyr Leu Ala Phe Pro Met Ala Arg Trp Tyr
530 535 540

Ser Asp Lys Cys Ala Glu Met Val Thr Gly Leu Gly Arg Lys Tyr Ile
545 550 555 560

Gln Glu Thr Ile Glu Lys Ala Glu Glu Phe Gly Phe Lys Val Ile Tyr
565 570 575

Ala Asp Thr Asp Gly Phe Tyr Ala Lys Trp Asp Tyr Asp Lys Leu Gln
580 585 590

Lys Gly Lys Lys Glu Glu Asn Asp Lys Ser Asp Lys Leu Ser Asn Leu
595 600 605

Pro Lys Leu Ser Lys Glu Glu Leu Ile Ile Leu Thr Lys Lys Phe Leu

610 615 620

Lys Gly Ile Asn Glu Glu Leu Pro Glu Gly Met Glu Leu Glu Phe Glu
625 630 635 640

Gly His Phe Lys Arg Gly Leu Phe Val Thr Lys Lys Lys Tyr Ala Leu
645 650 655

Ile Glu Asp Asp Gly His Ile Val Val Lys Gly Leu Glu Val Val Arg
660 665 670

Arg Asp Trp Ser Asn Ile Ala Lys Asp Thr Gln Gln Ala Val Ile Arg
675 680 685

Ala Leu Leu Glu Asp Gly Asp Val Asn Leu Ala Lys Lys Ile Ile Lys
690 695 700

Asn Thr Ile Asp Asn Leu Lys Lys Gly Asn Ile Asp Lys Asn Asp Leu
705 710 715 720

Leu Ile His Thr Gln Leu Thr Lys Asn Ile Glu Glu Tyr Lys Ser Thr
725 730 735

Ala Pro His Ile Glu Val Ala Lys Lys Ile Lys Gln Arg Gly Asp Ser
740 745 750

Val Arg Val Gly Asp Val Ile Ser Tyr Ile Ile Val Lys Gly Ser Arg
755 760 765

Ser Ile Ser Glu Arg Ala Glu Leu Leu Glu Tyr Ala Gly Asp Tyr Asp
770 775 780

Ile Asn Tyr Tyr Ile Asp Asn Gln Val Leu Pro Pro Val Ile Arg Ile
785 790 795 800

Met Glu Ser Leu Gly Ile Ser Glu Asp Glu Leu Lys Asn Ser Gly Lys
805 810 815

Gln Phe Lys Leu Asp Gln Phe Met
820

<210> 104
<211> 785
<212> PRT
<213> Pyrobaculum islandicum

<400> 104

Met Glu Leu Lys Val Trp Pro Leu Asp Ile Thr Tyr Ala Val Val Gly

1 5 10 15

Ser Val Pro Glu Ile Arg Ile Phe Gly Ile Leu Ser Ser Gly Glu Arg
20 25 30

Val Val Leu Ile Asp Arg Ser Phe Lys Pro Tyr Phe Tyr Val Asp Cys
35 40 45

Ala Val Cys Glu Pro Ala Ala Leu Lys Thr Ala Leu Ser Arg Val Ala
50 55 60

Pro Ile Asp Asp Val Gln Ile Val Glu Arg Arg Phe Leu Gly Arg Ser
65 70 75 80

Lys Lys Phe Leu Lys Val Ile Ala Lys Ile Pro Glu Asp Val Arg Lys
85 90 95

Leu Arg Glu Ala Ala Met Ser Ile Pro Arg Val Ser Gly Val Tyr Glu
100 105 110

Ala Asp Ile Arg Phe Tyr Met Arg Tyr Met Ile Asp Met Gly Val Val
115 120 125

Pro Cys Ser Trp Asn Val Ala Glu Val Glu Glu Gly Gly Arg Leu Gly
130 135 140

Gly Ile Pro Thr Tyr Val Val Ser Gln Trp Tyr Gly Ile Asp Glu Gly
145 150 155 160

Phe Pro Pro Ser Leu Lys Val Met Ala Phe Asp Ile Glu Val Tyr Asn
165 170 175

Glu Arg Gly Ser Pro Asp Pro Ile Arg Asp Pro Val Val Met Leu Ala
180 185 190

Ile Lys Thr Asn Asp Gly His Glu Glu Val Phe Glu Ala Ser Gly Lys
195 200 205

Asp Asp Arg Gly Val Val Arg Ala Phe Val Asp Phe Ile Arg Ser Tyr
210 215 220

Asp Pro Asp Val Ile Val Gly Tyr Asn Ser Asn Gly Phe Asp Trp Pro
225 230 235 240

Tyr Leu Val Glu Arg Ala Lys Ala Val Gly Val Pro Leu Lys Val Asp
245 250 255

Arg Leu Ser Asn Pro Pro Gln Gln Ser Val Tyr Gly His Trp Ser Ile
260 265 270

Val Gly Arg Ala Asn Val Asp Leu Tyr Asn Ile Val Glu Glu Phe Pro
275 280 285

Glu Ile Lys Leu Lys Thr Leu Asp Arg Val Ala Glu Tyr Phe Gly Val
290 295 300

Met Lys Arg Glu Glu Arg Val Leu Ile Pro Gly His Lys Ile Tyr Glu
305 310 315 320

Tyr Trp Lys Asp Pro Asn Lys Arg Pro Leu Leu Lys Arg Tyr Val Leu
325 330 335

Asp Asp Val Arg Ser Thr Leu Gly Leu Ala Asp Lys Leu Leu Pro Phe
340 345 350

Leu Ile Gln Leu Ser Ser Val Ser Gly Leu Pro Leu Asp Gln Val Ala
355 360 365

Ala Ala Ser Val Gly Asn Arg Val Glu Trp Met Leu Leu Arg Tyr Ala
370 375 380

Tyr Arg Leu Gly Glu Val Ala Pro Asn Arg Glu Glu Arg Glu Tyr Glu
385 390 395 400

Pro Tyr Lys Gly Ala Ile Val Leu Glu Pro Lys Pro Gly Met Tyr Glu
405 410 415

Asp Val Leu Val Leu Asp Phe Ser Ser Met Tyr Pro Asn Ile Met Met
420 425 430

Lys Tyr Asn Leu Ser Pro Asp Thr Tyr Leu Glu Pro Gly Glu Pro Asp
435 440 445

Pro Pro Glu Gly Val Asn Val Ala Pro Glu Val Gly His Arg Phe Arg
450 455 460

Arg Ser Pro Pro Gly Phe Val Pro Gln Val Leu Lys Ser Leu Val Glu
465 470 475 480

Leu Arg Lys Ala Val Arg Glu Glu Ala Lys Lys Tyr Pro Pro Asp Ser
485 490 495

Pro Glu Phe Lys Ile Leu Asp Glu Arg Gln Arg Ala Leu Lys Val Met
500 505 510

Ala Asn Ala Ile Tyr Gly Tyr Leu Gly Trp Val Gly Ala Arg Trp Tyr
515 520 525

Lys Arg Glu Val Ala Glu Ser Val Thr Ala Phe Ala Arg Ala Ile Leu
530 535 540

Lys Asp Val Ile Glu Gln Ala Arg Arg Leu Gly Ile Val Val Val Tyr
545 550 555 560

Gly Asp Thr Asp Ser Leu Phe Val Lys Lys His Gly Asp Val Asp Lys
565 570 575

Leu Ile Lys Tyr Val Glu Glu Lys Tyr Gly Ile Asp Ile Lys Val Asp
580 585 590

Lys Asp Tyr Ala Lys Val Leu Phe Thr Glu Ala Lys Lys Arg Tyr Ala
595 600 605

Gly Leu Leu Arg Asp Gly Arg Ile Asp Ile Val Gly Phe Glu Val Val
610 615 620

Arg Gly Asp Trp Ser Glu Leu Ala Lys Asp Val Gln Leu Arg Val Ile
625 630 635 640

Glu Ile Ile Leu Lys Ser Arg Asp Ile Val Glu Ala Arg His Gly Val
645 650 655

Ile Lys Tyr Ile Arg Glu Ile Ile Glu Arg Leu Lys Asn Tyr Lys Phe
660 665 670

Asn Ile Asp Asp Leu Ile Ile Trp Lys Thr Leu Asp Lys Glu Leu Asp
675 680 685

Glu Tyr Lys Ala Tyr Pro Pro His Val His Ala Ala Gln Ile Leu Lys
690 695 700

Arg His Gly Tyr Arg Val Gly Lys Gly Thr Thr Ile Gly Tyr Val Ile
705 710 715 720

Val Lys Gly Gly Glu Lys Val Ser Glu Arg Ala Leu Pro Tyr Ile Leu
725 730 735

Leu Asp Asp Ile Lys Lys Ile Asp Ile Asp Tyr Tyr Ile Glu Arg Gln
740 745 750

Ile Ile Pro Ala Ala Leu Arg Ile Ala Glu Val Ile Gly Val Lys Glu
755 760 765

Ser Asp Leu Lys Thr Gly Arg Met Glu Arg Ser Leu Leu Asp Phe Leu
770 775 780

Ser
785

<210> 105
<211> 844
<212> PRT
<213> Cenarchaeum symbiosum

<400> 105

Met Thr Val Gln Asp Ala Val Glu Ile Pro Pro Ser Leu Leu Val Ser
1 5 10 15

Ala Thr Tyr Asp Ser Gln Ala Gly Ala Val Val Leu Lys Phe Tyr Glu
20 25 30

Pro Glu Ser Gln Lys Ile Val His Trp Thr Asp Asn Thr Gly His Lys
35 40 45

Pro Tyr Cys Tyr Thr Arg Gln Pro Pro Ser Glu Leu Gly Glu Leu Glu
50 55 60

Gly Arg Glu Asp Val Leu Gly Thr Glu Gln Val Met Arg His Asp Leu
65 70 75 80

Ile Ala Asp Lys Asp Val Pro Val Thr Lys Ile Thr Val Ala Asp Pro
85 90 95

Leu Ala Ile Gly Gly Thr Asn Ser Glu Lys Ser Ile Arg Asn Ile Met
100 105 110

Asp Thr Trp Glu Ser Asp Ile Lys Tyr Tyr Glu Asn Tyr Leu Tyr Asp
115 120 125

Lys Ser Leu Val Val Gly Arg Tyr Tyr Ser Val Ser Gly Gly Lys Val
130 135 140

Ile Pro His Asp Met Pro Ile Ser Asp Glu Val Lys Leu Ala Leu Lys
145 150 155 160

Ser Leu Leu Trp Asp Lys Val Val Asp Glu Gly Met Ala Asp Arg Lys
165 170 175

Glu Phe Arg Glu Phe Ile Ala Gly Trp Ala Asp Leu Leu Asn Gln Pro
180 185 190

Ile Pro Arg Ile Arg Arg Leu Ser Phe Asp Ile Glu Val Asp Ser Glu
195 200 205

Glu Gly Arg Ile Pro Asp Pro Lys Ile Ser Asp Arg Arg Val Thr Ala
210 215 220

Val Gly Phe Ala Ala Thr Asp Gly Leu Lys Gln Val Phe Val Leu Arg
225 230 235 240

Ser Gly Ala Glu Glu Gly Glu Asn Gly Val Thr Pro Gly Val Glu Val
245 250 255

Val Phe Tyr Asp Lys Glu Ala Asp Met Ile Arg Asp Ala Leu Ser Val
260 265 270

Ile Gly Ser Tyr Pro Phe Val Leu Thr Tyr Asn Gly Asp Asp Phe Asp
275 280 285

Met Pro Tyr Met Leu Asn Arg Ala Arg Arg Leu Gly Val Ser Asp Ser
290 295 300

Asp Ile Pro Leu Tyr Met Met Arg Asp Ser Ala Thr Leu Arg His Gly
305 310 315 320

Val His Leu Asp Leu Tyr Arg Thr Phe Ser Asn Arg Ser Phe Gln Leu
325 330 335

Tyr Ala Phe Ala Ala Lys Tyr Thr Asp Tyr Ser Leu Asn Ser Val Thr
340 345 350

Lys Ala Met Leu Gly Glu Gly Lys Val Asp Tyr Gly Val Lys Leu Gly
355 360 365

Asp Leu Thr Leu Tyr Gln Thr Ala Asn Tyr Cys Tyr His Asp Ala Arg
370 375 380

Leu Thr Leu Glu Leu Ser Thr Phe Gly Asn Glu Ile Leu Met Asp Leu
385 390 395 400

Leu Val Val Thr Ser Arg Ile Ala Arg Met Pro Ile Asp Asp Met Ser
405 410 415

Arg Met Gly Val Ser Gln Trp Ile Arg Ser Leu Leu Tyr Tyr Glu His
420 425 430

Arg Gln Arg Asn Ala Leu Ile Pro Arg Arg Asp Glu Leu Glu Gly Arg

435 440 445

Ser Arg Glu Val Ser Asn Asp Ala Val Ile Lys Asp Lys Lys Phe Arg
450 455 460

Gly Gly Leu Val Val Glu Pro Glu Glu Gly Ile His Phe Asp Val Thr
465 470 475 480

Val Met Asp Phe Ala Ser Leu Tyr Pro Ser Ile Ile Lys Val Arg Asn
485 490 495

Leu Ser Tyr Glu Thr Val Arg Cys Val His Ala Glu Cys Lys Lys Asn
500 505 510

Thr Ile Pro Asp Thr Asn His Trp Val Cys Thr Lys Asn Asn Gly Leu
515 520 525

Thr Ser Met Ile Ile Gly Ser Leu Arg Asp Leu Arg Val Asn Tyr Tyr
530 535 540

Lys Ser Leu Ser Lys Ser Thr Ser Ile Thr Glu Glu Gln Arg Gln Gln
545 550 555 560

Tyr Thr Val Ile Ser Gln Ala Leu Lys Val Val Leu Asn Ala Ser Tyr
565 570 575

Gly Val Met Gly Ala Glu Ile Phe Pro Leu Tyr Phe Leu Pro Ala Ala
580 585 590

Glu Ala Thr Thr Ala Val Gly Arg Tyr Ile Ile Met Gln Thr Ile Ser
595 600 605

His Cys Glu Gln Met Gly Val Arg Val Leu Tyr Gly Asp Thr Asp Ser
610 615 620

Leu Phe Ile Lys Asp Pro Glu Glu Arg Gln Ile His Glu Ile Val Glu
625 630 635 640

His Ala Lys Lys Glu His Gly Val Glu Leu Glu Val Asp Lys Glu Tyr
645 650 655

Arg Tyr Val Val Leu Ser Asn Arg Lys Lys Asn Tyr Phe Gly Val Thr
660 665 670

Arg Ala Gly Lys Val Asp Val Lys Gly Leu Thr Gly Lys Lys Ser His
675 680 685

Thr Pro Pro Phe Ile Lys Glu Leu Phe Tyr Ser Leu Leu Asp Ile Leu
690 695 700

Ser Gly Val Glu Ser Glu Asp Glu Phe Glu Ser Ala Lys Met Arg Ile
705 710 715 720

Ser Lys Ala Ile Ala Ala Cys Gly Lys Arg Leu Glu Glu Arg Gln Ile
725 730 735

Pro Leu Val Asp Leu Ala Phe Asn Val Met Ile Ser Lys Ala Pro Ser
740 745 750

Glu Tyr Val Lys Thr Val Pro Gln His Ile Arg Ala Ala Arg Leu Leu
755 760 765

Glu Asn Ala Arg Glu Val Lys Lys Gly Asp Ile Ile Ser Tyr Val Lys
770 775 780

Val Met Asn Lys Thr Gly Val Lys Pro Val Glu Met Ala Arg Ala Gly
785 790 795 800

Glu Val Asp Thr Ser Lys Tyr Leu Glu Phe Met Glu Ser Thr Leu Asp
805 810 815

Gln Leu Thr Ser Ser Met Gly Leu Asp Phe Asp Glu Ile Leu Gly Lys
820 825 830

Pro Lys Gln Thr Gly Met Glu Gln Phe Phe Phe Lys
835 840

<210> 106
<211> 875
<212> PRT
<213> Sulfolobus acidocaldarius

<400> 106

Met Ser Lys Gln Ala Thr Leu Phe Asp Phe Ser Ile Lys Lys Asn Glu
1 5 10 15

Ser Lys Glu Gln Thr Asn Gln Glu Ser Val Glu Val Pro Lys Gln Thr
20 25 30

Ala Asn Arg Thr Lys Ile Glu Trp Ile Lys Glu Ala Glu Asp Gly Lys
35 40 45

Val Tyr Phe Leu Leu Gln Val Asp Tyr Asp Gly Lys Lys Ser Arg Ala
50 55 60

Val Cys Lys Leu Tyr Asp Lys Glu Gly Lys Lys Ile Tyr Ile Met Gln
65 70 75 80

Asp Glu Ser Gly His Lys Pro Tyr Phe Leu Thr Asp Ile Asp Pro Asp
85 90 95

Lys Val Asn Lys Ile Thr Lys Val Val Arg Asp Pro Ser Phe Asp His
100 105 110

Leu Glu Leu Ile Asn Lys Val Asp Pro Tyr Thr Gly Lys Lys Ile Arg
115 120 125

Leu Thr Lys Ile Val Val Lys Asp Pro Leu Ala Val Arg Arg Met Arg
130 135 140

Ser Ser Leu Pro Lys Ala Tyr Glu Ala His Ile Lys Tyr Tyr Asn Asn
145 150 155 160

Tyr Val Tyr Asp Asn Gly Leu Ile Pro Gly Leu Ile Tyr Lys Val Asn
165 170 175

Lys Gly Lys Leu Thr Gln Leu Asn Pro Glu Leu Lys Gly Glu Glu Ile
180 185 190

Asn Glu Ile Lys Lys Leu Ser Asp Ala Tyr Glu Met Thr Lys Glu Thr
195 200 205

Val Asn Asp Trp Ile Pro Ile Leu Glu Thr Glu Val Pro Asp Ile Lys
210 215 220

Arg Val Ser Leu Asp Ile Glu Val Tyr Thr Pro Asn Arg Gly Arg Ile
225 230 235 240

Pro Asp Pro Glu Arg Ala Glu Phe Pro Ile Ile Ser Val Ala Leu Ala
245 250 255

Gly Asn Asp Gly Ser Lys Ile Val Leu Ala Leu Lys Arg Glu Asp Val
260 265 270

Asn Ser Asp Phe Ser Lys Lys Asp Gly Val Gln Val Glu Ile Phe Asp
275 280 285

Ser Glu Lys Lys Leu Leu Ala Arg Leu Phe Glu Ile Ile Arg Glu Tyr
290 295 300

Pro Met Leu Leu Thr Phe Asn Gly Asp Asp Phe Asp Ile Pro Tyr Ile
305 310 315 320

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Tyr Phe Arg Ala Leu Arg Leu Asn Phe Ser Pro Glu Glu Val Pro Leu
                325                 330                 335

Asp Val Val Ser Gly Glu Gly Lys Phe Leu Ala Gly Ile His Ile Asp
            340                 345                 350

Leu Tyr Lys Phe Phe Phe Asn Arg Ala Val Ser Ile Tyr Ala Phe Glu
        355                 360                 365

Gly Lys Tyr Ser Glu Tyr Ser Leu Tyr Ala Val Ala Thr Ala Leu Leu
    370                 375                 380

Gly Ile Ser Lys Val Lys Leu Asp Thr Phe Ile Ser Phe Met Asp Ile
385                 390                 395                 400

Asp Lys Leu Ile Glu Tyr Asn Leu Arg Asp Ala Glu Ile Thr Leu Lys
                405                 410                 415

Leu Thr Thr Phe Asn Asn Asn Leu Val Leu Lys Leu Met Val Leu Leu
            420                 425                 430

Ala Arg Ile Ser Lys Leu Gly Leu Glu Glu Leu Thr Arg Thr Glu Val
        435                 440                 445

Ser Thr Trp Ile Lys Asn Leu Tyr Tyr Trp Glu His Arg Lys Arg Asn
    450                 455                 460

Trp Leu Ile Pro Leu Lys Glu Glu Ile Leu Val Arg Ser Asn Gln Val
465                 470                 475                 480

Lys Thr Ala Ala Val Ile Lys Gly Lys Lys Tyr Lys Gly Ala Val Val
                485                 490                 495

Ile Asp Pro Pro Ala Gly Val Tyr Phe Asn Val Val Val Leu Asp Phe
            500                 505                 510

Ala Ser Leu Tyr Pro Ser Ile Ile Lys Asn Trp Asn Ile Ser Tyr Glu
        515                 520                 525

Thr Ile Glu Ile Asp Glu Cys Thr Lys Lys Val Trp Val Glu Asp Glu
    530                 535                 540

Thr Gly Glu Lys Leu His Tyr Val Cys Met Asp Lys Pro Gly Ile Thr
545                 550                 555                 560

Ala Val Tyr Gln Gly Leu Ile Arg Asp Phe Arg Val Lys Val Tyr Lys
                565                 570                 575
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Lys Lys Ala Lys Tyr Ser Asn Ile Ser Glu Glu Gln Arg Ser Leu Tyr
580 585 590

Asp Val Val Gln Arg Ala Met Lys Val Phe Ile Asn Ala Thr Tyr Gly
595 600 605

Val Phe Gly Ala Glu Asn Phe Pro Leu Tyr Ala Pro Ala Val Ala Glu
610 615 620

Ser Val Thr Ala Ile Gly Arg Tyr Ile Ile Thr Thr Thr Tyr Lys Gln
625 630 635 640

Ala Glu Lys Leu Asn Leu Lys Val Ile Tyr Gly Asp Thr Asp Ser Leu
645 650 655

Phe Leu Tyr Asn Pro Thr Lys Asp Lys Leu Glu Glu Leu Ile Lys Phe
660 665 670

Val Lys Gln Asn Phe Asn Leu Asp Leu Glu Val Asp Asn Thr Tyr Lys
675 680 685

Tyr Val Ala Tyr Ser Gly Leu Lys Lys Asn Tyr Phe Gly Val Tyr Pro
690 695 700

Asp Gly Lys Thr Glu Ile Lys Gly Met Leu Ala Lys Lys Arg Asn Thr
705 710 715 720

Pro Glu Phe Ile Lys Lys Glu Phe Ala Glu Ile Lys Asn Met Leu Ala
725 730 735

Ser Leu Asn Ser Pro Asn Asp Ile Pro Glu Val Lys Asn Lys Leu Glu
740 745 750

Ile Lys Ile Lys Asp Ile Tyr Tyr Lys Leu Arg Asn Lys Gly Tyr Asn
755 760 765

Leu Asp Asp Leu Ala Phe Arg Ile Met Leu Ser Lys Pro Leu Asp Ser
770 775 780

Tyr Thr Lys Asn Thr Pro Gln His Val Lys Ala Gly Leu Gln Leu Arg
785 790 795 800

Ala Phe Gly Val Asn Val Leu Pro Arg Asp Val Ile Met Phe Val Lys
805 810 815

Val Lys Ser Lys Asp Gly Val Lys Ala Tyr Gln Leu Ala Lys Ile Ser

820 825 830

Glu Ile Asp Ile Glu Lys Tyr Val Glu Thr Leu Arg Thr Thr Phe Glu
835 840 845

Gln Ile Leu Lys Ala Phe Gly Ile Ser Trp Asp Glu Ile Val Ser Thr
850 855 860

Ile Ser Ile Asp Ser Phe Phe Gly Ser Lys Lys
865 870 875

<210> 107
<211> 872
<212> PRT
<213> Sulfurisphaera ohwakuensis

<400> 107

Met Ala Arg Gln Ile Thr Leu Phe Asp Phe Thr Leu Lys Lys Glu Gln
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Asn Lys Asp Glu Ser Arg Lys Glu Glu Ile Pro His Ala Asn Ile Asn
20 25 30

Glu Glu Arg Arg Lys Pro Lys Glu Trp Ile Lys Glu Ala Glu Glu Gly
35 40 45

Lys Ser Tyr Phe Leu Leu Gln Val Asp Tyr Asp Gly Lys Lys Ser Lys
50 55 60

Ala Ile Cys Lys Leu Tyr Asp Lys Glu Thr Lys Lys Ile Tyr Ile Leu
65 70 75 80

Tyr Asp Asn Thr Gly His Lys Pro Tyr Phe Leu Thr Asp Ile Asp Pro
85 90 95

Glu Lys Val Asn Lys Ile Pro Lys Val Val Arg Asp Pro Ser Phe Asp
100 105 110

His Leu Glu Thr Val Ile Lys Ile Asp Pro Tyr Ser Gly Asn Lys Ile
115 120 125

Lys Leu Thr Lys Ile Val Val Lys Asp Pro Leu Ala Val Arg Arg Met
130 135 140

Arg Asn Ser Val Pro Lys Ala Tyr Glu Ala His Ile Lys Tyr Phe Asn
145 150 155 160

Asn Tyr Ile Tyr Asp Leu Gly Leu Ile Pro Gly Leu Pro Tyr Val Val

165 170 175

Lys Lys Gly Lys Leu Glu Gln Leu Arg Pro Glu Leu Lys Gly Glu Glu
180 185 190

Val Asp Glu Ile Arg Lys Ala Phe Ala Asp Ser Asp Glu Met Thr Lys
195 200 205

Glu Ala Val Asn Asp Trp Ile Pro Ile Phe Glu Ser Glu Val Pro Asp
210 215 220

Val Lys Arg Val Ala Ile Asp Ile Glu Val Tyr Thr Pro Ile Lys Gly
225 230 235 240

Arg Ile Pro Asp Pro Glu Lys Ala Glu Phe Pro Ile Ile Ser Ile Ser
245 250 255

Leu Ala Gly Asn Asp Gly Thr Lys Arg Val Leu Val Leu Leu Arg Glu
260 265 270

Asp Val Asn Ser Gln Ile Thr Lys His Asp Val Ile Val Glu Thr Phe
275 280 285

Lys Ser Glu Arg Glu Leu Ile Arg Arg Phe Phe Asp Ile Ile Leu Asp
290 295 300

Tyr Pro Ile Ile Leu Thr Phe Asn Gly Asp Asp Phe Asp Ile Pro Tyr
305 310 315 320

Ile Tyr Tyr Arg Ala Leu Lys Leu Asn Phe Thr Pro Glu Glu Ile Pro
325 330 335

Phe Asp Ile Ile Asn Asp Glu Gly Lys Tyr Leu Ala Gly Ile His Ile
340 345 350

Asp Leu Tyr Lys Phe Phe Phe Asn Arg Ala Ile Arg Asn Tyr Ala Phe
355 360 365

Glu Gly Lys Tyr Asn Glu Tyr Asn Leu Asp Ala Val Ala Thr Ala Leu
370 375 380

Leu Gly Met Ser Lys Val Lys Leu Asp Thr Leu Ile Ser Phe Leu Asp
385 390 395 400

Leu Asp Lys Leu Ile Glu Tyr Asn Ser Arg Asp Ala Glu Ile Thr Leu
405 410 415

Lys Leu Thr Thr Phe Asn Asn Asn Leu Val Trp Lys Leu Ile Ile Leu
420 425 430

Leu Ala Arg Ile Ser Lys Met Gly Leu Glu Glu Leu Thr Arg Thr Glu
435 440 445

Val Ser Thr Trp Ile Lys Asn Leu Tyr Tyr Trp Glu His Arg Arg Arg
450 455 460

Asn Trp Leu Ile Pro Leu Lys Glu Glu Ile Leu Thr Arg Ser Ser Gln
465 470 475 480

Ile Lys Thr Ala Ala Ile Ile Lys Gly Lys Arg Tyr Lys Gly Ala Val
485 490 495

Val Ile Asp Pro Pro Ala Gly Val Phe Phe Asn Val Val Val Leu Asp
500 505 510

Phe Ala Ser Leu Tyr Pro Ser Ile Ile Arg Asn Trp Asn Ile Ser Tyr
515 520 525

Glu Thr Val Asp Val Glu Asn Cys Lys Asn Lys Glu Tyr Val Arg Asp
530 535 540

Glu Thr Gly Glu Val Leu His Tyr Ile Cys Lys Asp Lys Pro Gly Ile
545 550 555 560

Thr Ala Val Ile Thr Gly Leu Leu Arg Asp Phe Arg Val Lys Val Tyr
565 570 575

Lys Lys Lys Ala Lys Ser Gln Asn Ile Ser Glu Glu Gln Arg Ser Val
580 585 590

Tyr Asp Val Val Gln Arg Ala Met Lys Val Phe Ile Asn Ala Thr Tyr
595 600 605

Gly Val Phe Gly Ala Glu Asn Phe Pro Leu Tyr Ala Pro Ala Val Ala
610 615 620

Glu Ser Val Thr Ala Ile Gly Arg Tyr Val Ile Thr Thr Thr Val Asn
625 630 635 640

Tyr Cys Arg Ser Ile Gly Leu Gln Val Leu Tyr Gly Asp Thr Asp Ser
645 650 655

Met Phe Leu Trp Asn Pro Ser Lys Glu Lys Leu Glu Glu Ile Ile Lys
660 665 670

Phe Val Lys Gly Lys Phe Gly Leu Asp Leu Glu Val Asp Lys Val Tyr
675 680 685

Lys Phe Val Ala Phe Ser Gly Leu Lys Lys Asn Tyr Leu Gly Val Tyr
690 695 700

Pro Asp Gly Lys Thr Asp Ile Lys Gly Met Leu Ala Lys Lys Arg Asn
705 710 715 720

Thr Pro Glu Phe Ile Lys Lys Glu Phe Asn Glu Val Lys Gln Leu Val
725 730 735

Thr Thr Ile Asn Ser Pro Asp Asp Ile Pro Lys Ile Arg Asp Gln Leu
740 745 750

Glu Tyr Lys Ile Lys Glu Ile Tyr Glu Lys Leu Arg His Lys Gly Tyr
755 760 765

Asn Leu Asp Glu Leu Ala Phe Arg Val Met Leu Ser Lys Pro Leu Glu
770 775 780

Ser Tyr Thr Lys Asn Thr Pro Gln His Val Lys Ala Ala Leu Gln Leu
785 790 795 800

Arg Ser Tyr Gly Val Met Val Leu Pro Arg Asp Ile Ile Met Phe Val
805 810 815

Lys Val Lys Ser Lys Asp Gly Val Lys Pro Val Gln Leu Ala Lys Leu
820 825 830

Ser Glu Ile Asp Val Asp Lys Tyr Ile Asp Ala Val Arg Ser Thr Phe
835 840 845

Glu Gln Ile Leu Lys Ala Phe Gly Leu Ile Gly Ala Asn Leu Leu Gln
850 855 860

Leu Leu Ser Ile Leu Ser Leu Thr
865 870

<210> 108
<211> 882
<212> PRT
<213> Sulfolobus solfataricus

<400> 108

Met Thr Lys Gln Leu Thr Leu Phe Asp Ile Pro Ser Ser Lys Pro Ala
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Lys Ser Glu Gln Asn Thr Gln Gln Ser Gln Gln Ser Ala Pro Val Glu
20 25 30

Glu Lys Lys Val Val Arg Arg Glu Trp Leu Glu Glu Ala Gln Glu Asn
35 40 45

Lys Ile Tyr Phe Leu Leu Gln Val Asp Tyr Asp Gly Lys Lys Gly Lys
50 55 60

Ala Val Cys Lys Leu Phe Asp Lys Glu Thr Gln Lys Ile Tyr Ala Leu
65 70 75 80

Tyr Asp Asn Thr Gly His Lys Pro Tyr Phe Leu Val Asp Leu Glu Pro
85 90 95

Asp Lys Val Gly Lys Ile Pro Lys Ile Val Arg Asp Pro Ser Phe Asp
100 105 110

His Ile Glu Thr Val Ser Lys Ile Asp Pro Tyr Thr Trp Asn Lys Phe
115 120 125

Lys Leu Thr Lys Ile Val Val Arg Asp Pro Leu Ala Val Arg Arg Leu
130 135 140

Arg Asn Asp Val Pro Lys Ala Tyr Glu Ala His Ile Lys Tyr Phe Asn
145 150 155 160

Asn Tyr Met Tyr Asp Ile Gly Leu Ile Pro Gly Met Pro Tyr Val Val
165 170 175

Lys Asn Gly Lys Leu Glu Ser Val Tyr Leu Ser Leu Asp Glu Lys Asp
180 185 190

Val Glu Glu Ile Lys Lys Ala Phe Ala Asp Ser Asp Glu Met Thr Arg
195 200 205

Gln Met Ala Val Asp Trp Leu Pro Ile Phe Glu Thr Glu Ile Pro Lys
210 215 220

Ile Lys Arg Val Ala Ile Asp Ile Glu Val Tyr Thr Pro Val Lys Gly
225 230 235 240

Arg Ile Pro Asp Ser Gln Lys Ala Glu Phe Pro Ile Ile Ser Ile Ala
245 250 255

Leu Ala Gly Ser Asp Gly Leu Lys Lys Val Leu Val Leu Asn Arg Asn
260 265 270

Asp Val Asn Glu Gly Ser Val Lys Leu Asp Gly Ile Ser Val Glu Arg
275 280 285

Phe Asn Thr Glu Tyr Glu Leu Leu Gly Arg Phe Phe Asp Ile Leu Leu
290 295 300

Glu Tyr Pro Ile Val Leu Thr Phe Asn Gly Asp Asp Phe Asp Leu Pro
305 310 315 320

Tyr Ile Tyr Phe Arg Ala Leu Lys Leu Gly Tyr Phe Pro Glu Glu Ile
325 330 335

Pro Ile Asp Val Ala Gly Lys Asp Glu Ala Lys Tyr Leu Ala Gly Leu
340 345 350

His Ile Asp Leu Tyr Lys Phe Phe Phe Asn Lys Ala Val Arg Asn Tyr
355 360 365

Ala Phe Glu Gly Lys Tyr Asn Glu Tyr Asn Leu Asp Ala Val Ala Lys
370 375 380

Ala Leu Leu Gly Thr Ser Lys Val Lys Val Asp Thr Leu Ile Ser Phe
385 390 395 400

Leu Asp Val Glu Lys Leu Ile Glu Tyr Asn Phe Arg Asp Ala Glu Ile
405 410 415

Thr Leu Gln Leu Thr Thr Phe Asn Asn Asp Leu Thr Met Lys Leu Ile
420 425 430

Val Leu Phe Ser Arg Ile Ser Arg Leu Gly Ile Glu Glu Leu Thr Arg
435 440 445

Thr Glu Ile Ser Thr Trp Val Lys Asn Leu Tyr Tyr Trp Glu His Arg
450 455 460

Lys Arg Asn Trp Leu Ile Pro Leu Lys Glu Glu Ile Leu Ala Lys Ser
465 470 475 480

Ser Asn Ile Arg Thr Ser Ala Leu Ile Lys Gly Lys Gly Tyr Lys Gly
485 490 495

Ala Val Val Ile Asp Pro Pro Ala Gly Ile Phe Phe Asn Ile Thr Val
500 505 510

Leu Asp Phe Ala Ser Leu Tyr Pro Ser Ile Ile Arg Thr Trp Asn Leu

515 520 525

Ser Tyr Glu Thr Val Asp Ile Gln Gln Cys Lys Lys Pro Tyr Glu Val
530 535 540

Lys Asp Glu Thr Gly Glu Val Leu His Ile Val Cys Met Asp Arg Pro
545 550 555 560

Gly Ile Thr Ala Val Ile Thr Gly Leu Leu Arg Asp Phe Arg Val Lys
565 570 575

Ile Tyr Lys Lys Lys Ala Lys Asn Pro Asn Asn Ser Glu Glu Gln Lys
580 585 590

Leu Leu Tyr Asp Val Val Gln Arg Ala Met Lys Val Phe Ile Asn Ala
595 600 605

Thr Tyr Gly Val Phe Gly Ala Glu Thr Phe Pro Leu Tyr Ala Pro Ala
610 615 620

Val Ala Glu Ser Val Thr Ala Leu Gly Arg Tyr Val Ile Thr Ser Thr
625 630 635 640

Val Lys Lys Ala Arg Glu Glu Gly Leu Thr Val Leu Tyr Gly Asp Thr
645 650 655

Asp Ser Leu Phe Leu Leu Asn Pro Pro Lys Asn Ser Leu Glu Asn Ile
660 665 670

Ile Lys Trp Val Lys Thr Thr Phe Asn Leu Asp Leu Glu Val Asp Lys
675 680 685

Thr Tyr Lys Phe Val Ala Phe Ser Gly Leu Lys Lys Asn Tyr Phe Gly
690 695 700

Val Tyr Gln Asp Gly Lys Val Asp Ile Lys Gly Met Leu Val Lys Lys
705 710 715 720

Arg Asn Thr Pro Glu Phe Val Lys Lys Val Phe Asn Glu Val Lys Glu
725 730 735

Leu Met Ile Ser Ile Asn Ser Pro Asn Asp Val Lys Glu Ile Lys Arg
740 745 750

Lys Ile Val Asp Val Val Lys Gly Ser Tyr Glu Lys Leu Lys Asn Lys
755 760 765

Gly Tyr Asn Leu Asp Glu Leu Ala Phe Lys Val Met Leu Ser Lys Pro
770 775 780

Leu Asp Ala Tyr Lys Lys Asn Thr Pro Gln His Val Lys Ala Ala Leu
785 790 795 800

Gln Leu Arg Pro Phe Gly Val Asn Val Leu Pro Arg Asp Ile Ile Tyr
805 810 815

Tyr Val Lys Val Arg Ser Lys Asp Gly Val Lys Pro Val Gln Leu Ala
820 825 830

Lys Val Thr Glu Ile Asp Ala Glu Lys Tyr Leu Glu Ala Leu Arg Ser
835 840 845

Thr Phe Glu Gln Ile Leu Arg Ala Phe Gly Val Ser Trp Asp Glu Ile
850 855 860

Ala Ala Thr Met Ser Ile Asp Ser Phe Phe Ser Tyr Pro Ser Lys Gly
865 870 875 880

Asn Ser

<210> 109
<211> 30
<212> DNA
<213> Artificial

<220>
<223> PCR primer

<400> 109
gggaaacata tgatccttga cgttgattac 30

<210> 110
<211> 31
<212> DNA
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<220>
<223> PCR primer

<400> 110
gggaaaggat cctcacttct tcttcccctt c 31